THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XI. No 254—14th YEAR.] LONDON, JULY 15, 1862. [Subscription per Ann. { 15s. in Advance / 18s Credit } DOUBLE No. Price 1s.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL has become the principal Cannel Coal used in the Metropolis. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. The Crystal Palace was lighted from it in 1851, and the Post-office, and *Times* Office, are at present.

FIRE-CLAY RETORTS and PIPES.

FIRE-BRICKS (marked "RAMSAY") OF ALL DESCRIPTIONS.

G. H. RAMSAY, Broad-chare, Newcastle-on-Tyne.

Manufactory established in 1804.

TO COAL MERCHANTS AND OTHERS.

MAIDSTONE GAS COMPANY.—Persons willing to supply the above Company with best unscreened South Brancepeth or West Wear Coals are requested to send TENDERS for either or both the above-named Coals to Messrs. Beale and Hoar, Maidstone, on or before the 22nd day of July instant. The Coals to be delivered free into the measures of the Company alongside their wharf at their works in Maidstone, at the times and in the quantities following—viz.:

		Tons.
In the month of August,	1862 ..	300
" " September,	" ..	500
" " October,	" ..	1000
" " November,	" ..	1000
" " December,	" ..	500
" " March,	1863 ..	700
		4000 tons.

The Coals to be paid for by cash on delivery.

The Company do not pledge themselves to accept the lowest or any other Tender.

BEALE AND HOAR, Clerks.

Maidstone, July 10, 1862.

ROCHESTER, Chatham, and Strood GASLIGHT COMPANY.

The vacancy at the Rochester Station, advertised in the last number, is filled up.

WILLIAM SYMS, Secretary.

TENDER FOR GASHOLDER.

THE Swindon Gas and Coke Company are desirous to receive TENDERS for a GASHOLDER, 36 ft. diameter, 14 ft. deep, with two tank-syphons for 5-in. stand-pipes.

The Contractor will be required to remove and take to the present gasholder, and fit the new one complete; and to tender separately for the brick-work.

A specification must be delivered with the tender.

The company do not pledge themselves to accept the lowest or any tender.

Apply to Mr. EDWARD VALLIS, Secretary, Wood Street, Swindon, WILTS.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.

Coal and Coke Office,

QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,

THE OLD TUBE WORKS,

CHURCH HILL, WEDNESBURY;

ALMA WORKS,

WALSALL, STAFFORDSHIRE;

and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

THE Directors of the Boston Gas COMPANY have for sale two very strong GASHOLDERS. Dimensions of each—diameter, 35 ft. 6 in.; depth 14 ft. They are worked by counterbalance weights; are in excellent working order; and may be inspected any day on the works. Working capacity, 12,000 ft. each.

The above are offered for sale, in consequence of being replaced by larger ones; and they will be sold cheap.

For price and particulars apply to WILLIAM STOUT, Manager.

Boston, Lincolnshire, July 4, 1862.

BLAYDON BURN AND LOW BENWELL FIRE CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:

JAMES LAWRIE & CO.,

63, OLD BROAD STREET, CITY, LONDON.

WANTED, a Storekeeper. One who understands Tin-work will be preferred, and is able to keep his proper accounts.

Apply to N. DEFRIES, Diana Place, EUSTON ROAD, stating salary expected.

WANTED, an Assistant competent to make Experiments in the consumption of Gas under various conditions. He must be acquainted fully with the character and employment of the various kinds of meters and pressure-gauges, and also with the use of the photometer; but he need not necessarily have a knowledge of gas manufacture.

Apply, by letter prepaid, stating terms, to A. B., care of Housekeeper, Old Jewry Chambers, CITY OF LONDON.

WANTED, a Station-Meter, to pass from 10,000 to 12,000 feet per hour.

Also, a GOVERNOR, to pass 20,000 feet per hour.

Address, stating prices, &c., to W. J. HAYWOOD, Secretary, Union Gas-Works, READING.

July 11, 1862.

WANTED, by the Advertiser, a Situation as MANAGER of a Country Gas-Work, who is well qualified by long practical experience. Satisfactory testimonials and references as to character and capabilities.

Address, WILLIAM SMITH, care of Mr. Horton, Manager, Gas-Works, Market-Raisin, LINCOLNSHIRE.

TO GAS COMPANIES AND OTHERS.

WANTED, a Situation in a Gas- Work, by a young man, aged 32, who thoroughly understands the various branches of gas manufacture, laying mains, fitting, &c. Is a good accountant. Good testimonials as to character and competency.

Address, A. B., 16, New Buckenham Square, DOVER ROAD, S.E.

THE IMPERIAL IRON TUBE COMPANY,

(SUCCESSORS TO GEORGE B. LLOYD & CO.,)

GAS STREET AND BERKLEY STREET,

BIRMINGHAM,

Manufacturers of Wrought-Iron Tubes and Fittings,

FOR GAS, STEAM, AND WATER.

PATENT GLASS ENAMELLED AND GALVANIZED TUBES,

AND

LAP-WELDED IRON BOILER TUBES.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED 1840.

JOHN EUNSON & SON,

Gas Engineers, and Manufacturers of Clay Retorts

AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

JOURNAL OF GAS LIGHTING

LLOYD AND LLOYD

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS,

PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from ⅛ in. to 6 in. bore.

STOCKS TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.;

PATENT LAP-WELDED IRON TUBES,

For Locomotive and Marine Boilers, &c.

LONDON WAREHOUSE—Nº 66, QUEEN STREET, E.C.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

SERVIER'S

PATENT

SELF-ACTING GAS GOVERNOR.

This Instrument, which is designed to replace the ordinary Governor,

Operates solely by the Action of the Gas, without any Alteration of Weights, or the Assistance of any intermediate Agency or Apparatus whatever;

And it will maintain a Constantly Uniform Pressure in Gas-Distributing Mains, at any given point of their circuit.

All Applications for Licences to Manufacture or to Use the Apparatus to be made to

Mr. W. H. BENNETT, 42, Parliament Street, Westminster.

R. LAIDLAW & SON,

GAS ENGINEERS, IRON & BRASS FOUNDERS,

Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,

GLASGOW;

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

STATION & CONSUMERS METERS, ALL SIZES;

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;

HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.

GASHOLDERS;

GOVERNORS, SLIDE-VALVES, &c.;

WROUGHT & CAST IRON ROOFS & HOUSES.

Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

SOLE AGENT FOR THE SOUTH, SOUTH-EAST, AND SOUTH-WEST OF ENGLAND:—

J. E. DOWSON, 38, DOWGATE HILL, THAMES STREET, LONDON, E.C.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

WILLIAM RICHARDS,

SOLE INVENTOR AND FIRST MANUFACTURER

OF THE

DRY GAS-METER,

Which obtained Prizes at the Exhibitions of London, 1851; New York, 1853; Paris, 1855; and three Prizes at the present Exhibition of 1862.

CRAWFORD PASSAGE, COPPICE ROW, CLERKENWELL, LONDON.

W. Richards invites the attention of Gas Companies and Engineers to the Dry Meter manufactured by him, as possessing advantages over others, by his method of disposing of the flexible material, so that collapsing or bagging of the same is avoided. This defect, so conspicuous in some of the meters of other makers shown at the Exhibition, causes the measurement of the instrument to vary under different circumstances, and the durability of the same is materially impaired.

In the meters manufactured by W. Richards, all the metals of the working parts are incorrodible; the flexible material, the best that can be employed; and, in general construction, they are not to be surpassed.

To those who prefer the Wet Meter, W. Richards submits his patented improvements in the same, which consist in contracting the measuring-wheel at, and near, the water-line—thus allowing of a longer range for the float, and avoiding the sudden extinctions now so common; also, a simple remedy is applied to prevent fraudulent consumption, which the operation of the Sales of Gas Act has so much facilitated.

TELL-TALE EXHAUST AND PRESSURE-INDICATORS;

GOVERNORS, STATION-METERS, &c.

WILLIAM SUGG,

MANUFACTURER OF

PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS.

"EVANS'S" PHOTOMETERS,

Experimental Meters, Minute Clocks, &c., Station Meters and Governors,

STREET-LAMP GOVERNORS AND LAVA BURNERS,

19 and 20, MARSHAM STREET, WESTMINSTER.

INTERNATIONAL EXHIBITION, 1862.

PHOTOMETERS, &c.,
Class 13,
(PHILOSOPHICAL INSTRUMENTS.)

METERS, GOVERNORS, &c.,
Class 31,
(Opposite the AMERICAN DEPARTMENT.)

WILLIAM & BENJAMIN COWAN,

PATENT WET & DRY GAS-METER MANUFACTURERS,

Buccleuch Street Works, Edinburgh, & 13, Strutt Street, Manchester.

Established 1827.

SOLE MANUFACTURERS OF

ESSON'S PATENT COMPENSATING GAS-METERS;

KAY'S PATENT HYDRAULIC VALVE GAS-METERS;

Also, DRY METERS OF THE MOST APPROVED DESCRIPTION;

All of the above being Stamped under the Provisions of the SALE OF GAS ACT.

W. and B. C. likewise supply ESSON'S PATENT COMPENSATING FOUNTAINS, and KAY'S PATENT HYDRAULIC VALVES, now so extensively used for bringing ordinary Meters within the requirements of the Act of Parliament. Gas Companies can, therefore, either attach the FOUNTAINS or VALVES to their old Meters themselves, or forward them to W. and B. C. for Alteration and Stamping.

GOVERNORS, STATION-METERS, PRESSURE-REGISTERS & GAUGES,

MINUTE-CLOCKS, PHOTOMETERS, EXPERIMENTAL METERS,

AND ALL OTHER DESCRIPTIONS OF GAS APPARATUS.

INTERNATIONAL EXHIBITION,

Class 31 (Sub-Class B), No. 6288.

THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

ANOTHER
MEDAL AWARDED BY THE JURY, INTERNATIONAL EXHIBITION,
1862.

THOMAS GLOVER has great pleasure in informing Gas Companies and his other Patrons, that the *Jury of Class XXXI. of the International Exhibition of* 1862 have awarded, for his Patent Dry Gas-Meter, *a Prize Medal.* The reason given for this Award, in the Juries Official Report, is, "*For excellence of manufacture, as regards Dry Meters.*" See Official Report, p. 346.

It is worthy of remark, that the only two other Firms who receive Awards *both manufacture imitations of Thomas Glover's* Patent Dry Gas-Meter, and the reason given for these Awards is "*construction* and sound workmanship." Thomas Glover, therefore, claims that the *construction* of his Meter has obtained *three Awards from the Jury of the International Exhibition of* 1862; at the same time, *contrasting* the Award granted for his Meter by the words, "*For excellence of manufacture, as regards Dry-Meters.*"

The Prize Meter will be found in Class XXXI., No. 6301, connected with a 1-foot holder, to demonstrate that a 50-light Meter *measures and indicates accurately the small quantity of One Foot.*

HEAD ESTABLISHMENT:

Suffolk Street, Clerkenwell Green, London, E.C.

BRANCH ESTABLISHMENTS:

Allen Street, Goswell Street, London, E.C.

MANCHESTER—12, Corporation Street (late 15, Market Street).

UNITED STATES—Barratt Street, Fulton Street, Boston, Massachusetts.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

CONTENTS.

Notes upon Passing Events:— PAGE

The Thames Embankment Project 453
The Proposed New Blackfriars Bridge 454
The New Lambeth Bridge 454
Death of Mr. Errington 455
Railways in France 455
Madlle. Royer on the Rights of Women 455

Circular to Gas Companies:—

The Awards of the Juries of the International Exhibition . . . 455
The Tramways Bill 457
The Gas-Meter Question at Sheffield 457
Claim of a Lord of a Manor to Stop the Laying of Gas-Pipes . . 457
Gas Examiners under the the Metropolis Gas Act, 1860 457

Correspondence:—

Gas-Meters: Wet and Dry 457
Surrey Gas Company and St. Olave's Parish 458

Register of New Patents:—

Kernot, C. N., and Rucker, M. D.—Improvements in Obtaining Ammoniacal Salts 458
Cartwright, M.—Improvements in Stench-Traps 458
Ross, W.—Improvements in Taps or Valves 459
Holt, C. H.—Improvements in Steam-Engines and Boilers . . . 459
Webster, J.—Improvements in Manufacturing Oxygen Gas . . . 459
Wainwright, J.—Improvements in Ventilating 459
Evans, F. J.—Improved Mode of, and Apparatus for, Carburetting Gas 459
Frost, H.—Improvements in Apparatus for Measuring Fluids . . . 459
Lord, W. B.—Improved Plug or Socket 460
Applications for Letters Patent 460
Grants of Provisional Protection 460
Notices to Proceed 460
Patents which have Become Void 460

Parliamentary Intelligence:—

Progress of Bills in House of Lords 460
Progress of Bills in House of Commons 461
House of Commons Committee—
Aberdeen Water-Works Extension 461

Miscellaneous News:—

Meeting of the Malta and Mediterranean Gas Company 467
Metropolis Gas Supply—City of London Court of Sewers 467
Metropolitan Board of Works 468
The Gas-Meter Question in Sheffield 468
Experiments on Illumination with Mineral Oils 471
Dr. J. Northcote Vineu's Report on the Gas Supplied by the Surrey Consumers Company 473
Lighting of Bahia with Gas 473

Price Current 473

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

W. S.—*Clegg on the "Manufacture of Coal-Gas" and Hughes's "Treatise on Gas." Both may be purchased at Weale's, 59, High Holborn.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, July 29, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 15, 1862.

Notes upon Passing Events.

THE Thames Embankment Bill has been pushed in the right direction since our last "Notes" appeared. In spite of the timidity of the Government, Mr. Locke has succeeded in kicking out, by a decided majority, the clause for spoiling the Westminster end of a work executed at public cost, for the pleasure of the Duke of Buccleuch, and his Richmond Terrace and Whitehall Garden friends. By this wholesome resistance to the compromising counsels of his ministerial friends, the member for Southwark has established his popularity on a safe and solid foundation, while Sir John Shelley has given one more proof of the utter hollowness of his professed liberality. This will, no doubt, be remembered when the day of a contested election arrives. A more complete political charlatan than this popularity-monger never stood on the hustings. All action and no go, like a circus horse, completely describes him. It is extraordinary that Lord Palmerston should have committed the mistake of opposing Mr. Locke's motion. Of one thing, we may be quite sure—he will not repeat it. He is a remarkable instance of a man never too old to learn; that, indeed, is one of the sources of his power in the House. All the documents connected with the committee's inquiries into the Thames Embankment Bill, are now published, and a very curious collection they are—as great a contrast to the business-like, intelligent inquiries of the embankment commissioners as it is possible to imagine. The Blue Book contains 348 folio pages, and 6103 questions, with appendices of correspondence between Mr. Gore and the Lords of the Treasury, and between the Treasury and the Office of Works. There is also a map showing the Commissioners and Mr. Pennethorne's two plans, and a complete collection of the official correspondence therein printed by order of the House of Commons. The question has been discussed in the House of Commons, and out of it, so completely as a personal quarrel—a sort of backwoods potshot duel, between Mr. Cowper, Lord Robert Montagu, Sir John Shelley, Mr. Horsman, and the two Mr. Higgins—that many persons interested are puzzled to understand the partial merits of the case. We will endeavour to explain them as well as it can be done without a diagram. The plan of the commissioners, embodied by Mr. Cowper in the Bill now in Parliament, contemplated a clear carriage-road alongside the north shore of the Thames, between Westminster and Blackfriars Bridges: this road to be relieved and fed by the following branch-streets, or communications with existing streets—viz., Whitehall Place, for vehicles going to or from the district of which the Horse-Guards is the centre; the Strand, by the streets descending to the Thames between Hungerford Market and Wellington Street; and also by a curved road uniting Surrey Street, Norfolk Street, and Arundel Street, with the embankment. The effect of this plan would be to draw all the traffic west or south of Westminster Bridge requiring to proceed to Charing Cross or the City direct along the river, instead of along Parliament Street. The Duke of Buccleuch, and the other river-side residents, would lose the access to the river, so valuable when the Thames was the great highway of London, but now of little moment; would lose some of their picturesque bits of the river during the few hours they live in London and look out of the window, would lose the privacy now only interrupted by the passing of barges and penny steamboats, and would gain 150 feet of garden or pleasure-ground, with a clean solid quay as a boundary instead of the stinking flats of mud or black gravel which now render the river-side gardens of Whitehall anything but agreeable at low water. On the advantage to the Duke of Northumberland, who will be paid for his wharves, and get a fine esplanade or open quay—on the advantage to such streets as Buckingham Street, which abut on a pestiferous mud-bank, or Norfolk Street, where last year a cook was smothered in mud after falling out of her kitchen window, it is unnecessary to dwell. The landlords of all these have made claims for compensation, because their property is about to be improved, and are to receive it in meal, or malt, money, or building land. But the Duke of Buccleuch was not content to have his residence improved at the cost of the taxpayers of the metropolis; he wanted to have the sole use of the embankment for a pleasure-ground: as it is, he will have a new garden of 1900 square yards. It is true he said that he would prefer the river to remain in its present condition, but that was a cheap boast. Every one knows that the embankment must be made—can no longer be deferred. It is only on a par with the speech of the horse-dealer, who sticks an extra fifty on the nag you fancy, because he wants "to keep it for his own riding." Well, there is nothing extraordinary in the duke's extravagant claims—nothing extraordinary that he should prefer his own fancies to the demands of public utility. He is accustomed to have his own way. He has been surrounded with toadies of every degree from his childhood. In the south of Scotland, he reigns a despot, with gloves of velvet, certainly, but fingers of steel. Only those who have witnessed it can conceive the reverential tone in which an Edinburgh club-man protests against anything however right being done, or anything however true being said, "because it would be displeasing to the duke." The duke has done his worst, and found out that

there is a public opinion in this country which can overwhelm all the influence of his Scotch and English "Macsycophants." But, whenever and however the Thames embankment may be settled, it will still be necessary to dissect the condition of a public office, "the Woods and Forests," which, being paid to do the work of the nation, sets itself systematically to work to sacrifice the taxpayers—to please a private friend—by an unlimited expenditure of public money. The outrageous extravagance and narrow-minded grasping avarice of the "Commissioners of Woods and Forests, and Land Revenues," have long provoked inquiry, which, it is probable, Mr. Charles Gore's last job will soon bring about.

Mr. Gore, the First Commissioner of Woods, &c., is the real author of the opposition which succeeded so well in committee, and failed so completely in the House of Commons. Mr. Gore stirred up the Crown lessees; Mr. Gore instructed or induced Mr. Pennethorne to prepare the two alternative plans which we will presently explain; and Mr. Gore used all his epistolary powers to persuade "My Lords" of the Treasury to make a *cul-de-sac* of the Thames embankment, in order to improve "the amenities of Montagu House." It is not often that we get such undoubted proofs of official incapacity or favouritism in black and white, brown, yellow, and blue plans. Mr. Gore patronizes two plans. By one—rider No. 1—it is proposed that the roadway shall stop at Whitehall Stairs, and there turn off opposite the Horse Guards, passing through some extremely valuable property belonging to the Crown, including Lord Carrington's house. It was also proposed to render Parliament Street more capable of accommodating the traffic which would be forced away from the embankment by taking away one side of King Street. An examination of the map will show that, under the commissioners plan, traffic coming along the embankment-road from Waterloo Bridge could turn off at Whitehall Stairs by a street opposite the Horse Guards. Therefore, this Gore-Pennethorne plan added nothing to the facilities of traffic, except by a costly widening of the Whitehall Stairs street. As to the enlargement of Parliament Street by the whole breadth of King Street, that was an improvement which might follow the construction of the embankment-road to Westminster Bridge, if funds could be found. In a word, Mr. Gore proposed that, after the main expense, the cost of the embankment to Westminster Bridge had been incurred, that Parliament Street should be widened at a cost of about £300,000, in order to give the Crown lessees between Whitehall Stairs and the bridge the exclusive enjoyment of a quay that will cost £90,000. So, in fact, Mr. Gore proposed that £390,000 should be spent to increase "the amenities" of Montagu House and Richmond Terrace. There was one little difficulty in the way of the scheme for making things pleasant with Mr. Gore's friends: that was a tide of traffic flowing at right angles into Whitehall Place, which was sure to produce the same sort of dead-lock so often found at the foot of Westminster Bridge in the height of the season. Mr. Pennethorne had previously prepared his "rider No. 2," in which the road, after leaving the embankment, passed through Whitehall Yard, between the back of the chapel and the Whitehall Gardens, over part of the site of Gwydyr House, and a corner of the garden of Montagu House. This route also involved taking down King Street immediately, and could only be executed by the sacrifice of very valuable Crown ground-rents in Whitehall Place.

Mr. Burn, the duke's architect, is quite the right man in the right place. It seems that from the first floor, which is fifteen feet from the ground, it will be easy to look over the roadway on the river. The basement story is occupied by the housekeeper's and butler's department, whose view of the river would be sacrificed to what Mr. Burn calls "this abominable road;" indeed, he thinks it "intolerable to talk of the first floor being the only point from which the duke is to have a view." He thinks the addition of 150 feet, which would be the result of the embankment, to the existing garden of 100 feet, would be no compensation at all for the loss of access to the river and the low-water banks, stinks included. Mr. Burn was, however, compelled to admit that the building of New Montagu House was not commenced until 1860, when Sir Joseph Paxton's select committee on the embankment was sitting. But perhaps neither he nor his employer ever read the newspapers! The total area added to the garden amounts to 1900 square yards, while the banks next to the river-wall would be covered with water at the lowest tides. After comparing this arrangement with the situation of Sutherland House, or Ellesmere, or Buckingham Palace, it is impossible not to be amazed at the pretensions of the duke and the plans of Mr. Gore. This is only one specimen—a flagrant one to be sure—of the manner which the Woods and Forests habitually sacrifice great public to private interests. It is high time the whole department was remodelled, and made more responsible. Those who remember the difficulties thrown in the way, the enormous contributions levied on those who have ever attempted to turn waste, unprofitable mud-banks into reproductive docks and piers, cannot but contrast their treatment with the First Commissioner's liberality to a ducal lessee, whose lease was obtained either by pressure or by a trick. The Woods and Forests must be overhauled. We commend the investigation to Mr. Caird, who much wants a subject for his energies since his Illinois speculation failed.

Westminster Bridge is at last nearly open (the May-day opening was a sham), not quite, for the western footpath is still unfinished. It must be confessed that these flat bridges are a great luxury to coachmen and horsemen. Since Waterloo Bridge, there has been nothing so convenient as Westminster. The painting is not so commendable as the gradients: to certain tastes, the green, the gold, and the red dots, may have a pretty effect, while fresh; but one cannot help asking, how often the process must be repeated, and at what cost? Some of these painted details can only be seen by curious steamboat-travellers.

The corporation of London have at length upset Mr. Wellington Vallance's elaborate arrangements for giving new Blackfriars Bridge to the engineer of Westminster, the three-arch scheme having been abandoned, and a new competition opened. This time, Mr. Joseph Cubitt has headed the poll. Poll is the right expression; for it was not an investigation assisted by competent advisers, but a case of canvass; and Mr. Cubitt's friends were most active. His position, too, as engineer to the Dover and Chatham Railway Bridge, which is to be within 100 feet of New Blackfriars, was one sound argument in his favour. Mr. Page was prejudiced by the way in which the first verdict had been snatched from an unprepared committee. Besides, the first details of his design were impracticable at any possible price. Competent authorities speak very highly of Mr. Fowler's design; but he seems not to have been acquainted with the artistic peculiarities of the City mind. A comparatively small drawing in sepia, however great its merits, could have no chance in the City in competition with a gigantic and highly-coloured drawing. It may be taken as a fixed rule that architectural and engineering designs, sent in for competition, should be on the largest, boldest scale, and in the brightest colours where the unprofessional uneducated men are the jury. It is satisfactory to know that, whether the best or the second best design has been adopted, New Blackfriars will be an immense and much-needed improvement on the old bridge; and that, combined with the embankment, and the railway to Farringdon Street, it will inaugurate the greatest metropolitan improvement of any age. Mr. Cubitt's design is for a bridge of five segmental arches of iron, with stone buttresses. The span of the centre arch is 189 feet; of the side arches, 176 feet; and of the abutment arches, 164 feet. The headway of the centre arch is 27 feet above high water; the available water-way, 869 feet. The breadth of the roadway is 75 feet; and the steepest inclination, 1 in 40. The cost is estimated at £265,000.

Another bridge, of an entirely different character, has been commenced, and nearly completed in the time, occupied by the Blackfriars "Bridge House Committee" in their double deliberations. This is the Lambeth wire-rope suspension bridge, constructed on a new principle, more remarkable for utility than beauty. The leading feature of this bridge is the economy of its construction, the total cost being set down at about £35,000, exclusive of approaches; and the site has been so skilfully chosen, that that usually-costly item will not swamp the profits of the undertaking. The cables were manufactured by Messrs. Newall on the spot. "They are composed of 28 strands, each containing 49 wires of charcoal iron, three-tenths of an inch in diameter, and are estimated to bear a total weight of 4000 tons, although the greatest strain produced by a *maximum* load of 70 lbs. per foot on the bridge will not exceed 600 tons, and, under ordinary circumstances, the strain will not exceed 400 tons, or one-tenth of the breaking weight. This wire was placed in position by means of a temporary bridge, steam-power being used to draw each strand separately across the river. The time consumed in placing and adjusting these massive cables, excluding the time em-

ployed in testing, was only fifteen working days. The platform of the bridge is composed of wrought-iron plates, forming a solid beam, and is connected to the cables by rigid lattice-sides similar to a girder, and in this respect differs from any previously-erected suspension bridge; indeed, the structure participates rather of the girder character than that of the suspension, having sufficient rigidity and strength to carry a double line of railway." We should be very sorry to see mere cheapness supersede fine designs in important situations; but, there are many points on rivers where it is a question between a cheap bridge and no bridge at all. At present, Battersea and Putney Bridges are a disgrace to the river, dangerous alike for passing over and passing under. They have been reported against more than once by the conservators of the Thames. An outrageous toll adds to the nuisance of Putney Bridge. It is to be hoped that the success of the Lambeth undertaking will lead to a new Putney Bridge Company. The vexed locality would, no doubt, readily subscribe all the funds required.

We note, with regret, the death of Mr. Errington, the surviving partner of the late Mr. Lock, at the seemingly fatal age to engineers of fifty-seven. Engaged for many years successfully on railway-works of the utmost importance, he never aspired to take any leading part in science or politics; but his occasional remarks in the discussions at the Institution of Civil Engineers were characterized by plain good sense, and were evidently the result of large and thoughtful experience. His fine personal appearance, and genial manners, impressed all who approached him most favourably, and with reason. At the recent rate of decease, the school of engineers, who rose by and took part in the works succeeding the Liverpool and Manchester Railway, will soon be extinct. Yet Lock and Errington seemed both built to reach three-score and ten years.

M. Wolowski, in a report he has recently made to the Academy of France on "*Les Chemins de Fer Aujourd'hui et dans Cent Ans, par M. Audiganne,*" defends railway companies from the attacks made on them for their differential tariffs—to which we recently drew attention—by an argument which is very neatly put. He says: "Formerly, the cost of the road formed an insignificant part of the cost of transport. The cost of carriage was everything; and, the more merchandize there was to be carried, the more vehicles were required, with proportionate expenses. At present, the road—that is the railroad (of which the locomotive is part)—is the principal expense; the traction is a minor affair. Whether the railroad does much or little work, the fixed expenses are large, and a great increase of work may be done at a very trifling increase of expense. Hence, it is the interest of railroad companies to attract as many customers as possible; and, with this view, they convey merchandize at rates which are not remunerative, as regards each of the three items of interest on fixed capital, interest or rolling stock, and cost of actual conveyance, sooner than run empty trucks in any direction. They are like the shipowner, who, having obtained a good freight one way, takes a cargo at any price the other, sooner than return in ballast. The protests against these arrangements," says M. Wolowski, "come from parties more accustomed to mathematical than commercial calculations. If railroad companies had been bound by inflexible tariffs, the public would have lost half the advantages of this new mode of conveyance."

The Paris Political Economy Society has been holding a discussion on the rights of women, at which, for the first time, a lady, Madlle. Clémence Royer, was present, and took part in the discussion. Madlle. Royer is the author of a work, *La Théorie de l'Impôt; ou, la Dîme Sociale*, which obtained a prize offered by the Canton de Vaud, Switzerland. In this essay she opposes all indirect taxation, and advocates an elaborate system of direct taxation, applied to three sources only, "land, capital, and income." All labourers and workers, male and female, are to be taxed, except mothers, who are supposed to pay the tax they owe the State by rearing children. On those who live on incomes without work, she proposes, after the model of Tom Paine, a graduated and increasing scale of taxation. To further complicate a scheme as ingenious as impracticable, she proposes to tax net income, only after deducting from each individual's earnings the sum required to provide the necessaries of life. Thus, like many other logical reasoners, especially of the foreign school, this clever lady loses her way in words, the meaning of which it is impossible to define. Still, this is a remarkable book, and worth reading as a curiosity. In this country, we are long past the stage of debating-society discussions on taxation. Taxation must be levied as easily as possible, consistently with economy, and very often theoretical justice and economy decline to go together in harness. An income-tax is almost an impossibility in any country where the majority of the taxpayers are peasant freeholders. What may be endured in England, would be intolerable in France.

Circular to Gas Companies.

The awards of the juries of the present International Exhibition have been made and declared at a much earlier period than during the Exhibition of 1851. Assuming that the work of examining the various objects contributed by the 25,000 exhibitors could be satisfactorily done in the time, this is a great improvement on the former arrangement, for those who have been successful in obtaining medals have an opportunity of displaying their goods with those marks of approbation attached, and thus, in accordance with the bazaar-like character of the Exhibition, the value of the wares may be enhanced, and the demand for them increased. We believe that the labours of the jurors were completed before the middle of last month, or within six weeks from the opening of the Exhibition; and, on Friday last, their awards were announced to the exhibitors with as much pomp and circumstance as it was possible to command. The procession of the commissioners through the principal avenues of the building, accompanied by the numerous distinguished personages whom they had invited to give *éclat* to the ceremony, for the purpose of distributing the jurors awards, was a gracious mode of making them known to the exhibitors, and contrasted favourably with the plan adopted on the previous occasion, when, after much speechifying on a platform erected in the centre of the transept, the awards of the juries were made partially known by the distribution of a small number of printed lists, and that ceremony, such as it was, did not take place until a short time before the final close of the Exhibition. In the endeavour to avoid the former error, the jurors appear, however, to have fallen into the opposite one of having been too hasty in their decisions, and the lavish hand with which they have distributed their honours has materially diminished their value. The number of medals awarded is nearly 7000, and of "honourable mentions" there are 5300, which amount together to about one-half the whole number of exhibitors. In the Exhibition of 1851, the jurors were more sparing in their marks of approbation, though the awards of 3000 medals among 17,000 exhibitors were then considered too indiscriminating. Of those medals, 170 only were awarded to the higher class, but the aristocracy of merit in 1862 includes 7000. In such a wholesale and necessarily hasty distribution of honours, the decisions of the juries must have been often uncertain and fallacious, and cannot fail to produce much dissatisfaction. By making so large a number of awards, the really meritorious exhibitors are mingled together with those whose merit is of dubious character, and the effect is rather to cast reproach on those who have not received a medal or honourable mention than to confer distinction on those who have. Several instances have already come to our knowledge of well-grounded dissatisfaction in the withholding of medals to exhibitors of gas-meters, and of other apparatus connected with the manufacture and distribution of gas. We noticed at the opening of the Exhibition the very incongruous manner in which gas apparatus had been spread about in ten different classes over most parts of the building, instead of being comprised within a separate class, and the inconvenience of this want of arrangement has been experienced in making the awards. The decision of the merits of the principal portion of the gas apparatus exhibited devolved on the juries of Class X. B, and of Class XXXI. B. The jury of the first of those classes (sanitary improvements and constructions) was composed of the following members:—

Niel Arnott, M.D., F.R.S., London, author of works on heating and ventilation, &c.

J. W. Bazalgette, C.E., London, engineer to the Metropolitan Board of Works.

— Delesse, France, engineer to the Imperial corps of mines; professor to the Normal School; president of the Geological Society.

Sir J. Olliffe, M.D., London, physician to the British embassy, Paris.

R. Angus Smith, M.D., F,R.S., Manchester, secretary to the Manchester Literary and Philosophical Society.
J. Sutherland, M.D. (president of section), London, member of the Royal Commission on the sanitary state of the Indian army.

The jury of Class XXXI. B (manufactures in copper and brass) consisted of—

S. Buckley, Birmingham, merchant.
E. Gem, Birmingham, merchant.
P. C. Hardwick (president of section), London, architect.
V. Paillard, France, bronze manufacturer.
Ferdinand Stamm, Ph. D., (secretary), Austria, member of the Austrian Parliament.
Dr. Von Steinbeis (chairman), Zollverein, director of the Royal Central Board of Industry and Commerce, Stuttgart.
A. Tylor (deputy-chairman), London, brass-founder.

Many of these gentlemen are well known, and are of high standing as men of science and practical men of business; but it may be doubted whether any of them possess the special knowledge requisite to enable them to form an opinion on the relative merits of clay retorts, or of meters, or other apparatus used in the manufacture, distribution, and combustion of gas. With respect to retorts, it may be observed that, considering the small number of specimens contributed by foreign manufacturers, the large proportion of medals awarded to them is very remarkable; and, in awarding medals to gas-meter makers, the jury have strangely omitted to bestow one on Mr. Richards, the original inventor and patentee of the dry gas-meter in its present form, and who exhibits a complete series of models, showing the various stages of progress in the manufacture, as well as excellent specimens of the instrument in its completed state. To this original inventor, "honourable mention" only has been awarded, "for general good workmanship;" while the ingenious and accurately-registering meter of Mr. Esson, and the unique and costly collection of apparatus used in the supply and combustion of gas exhibited by Messrs. Hulett and Co. has been passed over altogether unnoticed. On the other hand, we may observe that a medal has been granted, in Class A 2, to the Rev. Mr. Bowditch, for what is called "a new invention, intended for the removal of bisulphide of carbon from coal-gas;" and Messrs. Lenoir and Co., of France, have been equally fortunate in obtaining a medal, in Class VIII., for their gas-engine, the motive power of which is obtained by the explosion of a mixture of coal-gas with atmospheric air by the electric spark. The merit of this engine is stated to consist in its "practical utility," though it is regarded by engineers only as a philosophical toy.

The following is a list of the exhibitors of objects connected with the manufacture and supply of gas, to whom the juries have awarded medals or "honourable mentions":—

Coals and Cannels.

United Kingdom	196	Leeswood Green Colliery Company	Hon. men.
	278	Pirnie Coal Company	Hon. men.
	291	G. H. Ramsay and Sons	Hon. men

Clay Retorts and Fire Goods.

United Kingdom	2259	J. Cliff and Son	Medal.
	2265	J. Cowen and Co.	Medal.
	2344	W. Stephenson and Sons.	Medal.
Belgium	304	T. Boucher	Medal.
	308	Madame De Fuisseaux	Medal.
	316	A. Keller	Medal.
Victoria	456	G. F. Stieling	Hon. men.
France	1269	L. David	Hon. men.
Portugal	33	L. Louge	Hon. men

Castings.

United Kingdom	62	Cochrane and Co.	Hon. men.

Electric and Lime Lights.

United Kingdom	2914	F. H. Holmes	Medal.
	6338	Prosser and Standley	Medal.
France	1146	A. Berlioz and Co.	Medal.
	1437	V. Serrin	Medal.

Gas-Making Apparatus.

United Kingdom	2240	G. Bower	Hon. men.
	2332	Porter and Co.	Hon. men.

Gas-Burners.

United Kingdom	6322	S. Leoni	Medal.
	6349	W. Strode	Medal.
	6350	W. Sugg (Class XXXI. B)	Medal.
Bavaria	279	J. V. Schwarz	Medal.

Gas-Fittings and Tubes.

United Kingdom	1843	Eadie and Spence.	Medal.
	1894	Imperial Tube Company	Medal.
	1975	J. Russell and Sons	Medal.
	1912	Lloyd and Lloyd	Hon. men.
	1974	J. Russell and Co.	Hon. men.
	6152	A. May	Hon. men.
	6178	T. Phillips	Hon. men.
	6196	Rickets and Hammond	Hon. men.
	6284	Blews and Sons	Hon. men.
	6305	J. Hardman and Co.	Medal.
	6307	Hart and Son	Medal.
	6327	Messenger and Son	Medal.
	6335	C. J. Phillp	Medal.
	6345	Skidmore Art Manufactures Company	Medal.
	6352	J. Thomason and Co.	Medal.
	6352	J. Thomason and Co.	Medal.
	6354	W. Tonks and Son	Medal.
Bavaria	280	J. G. Städtler	Hon. men
France	3059	A. Lacarriére, Son, & Co.	Medal.

Gas-Meters and Regulators.

United Kingdom	6283	Bischoff, Brown, and Co.	Medal.
	6289	Croll, Rait, and Co.	Medal.
	6300	G. Glover and Co.	Medal.
	6301	T. Glover	Medal.
	6288	W. and B. Cowan	Hon. men.
	6342	W. Richards	Hon. men.
	6355	F. G. Underhay	Hon. men.

Tar and Ammonia Products.

United Kingdom	481	J. T. Bouck and Co.	Hon. men.
	494	Dr. Cattell	Hon. men.
	506	D. Dawson	Hon. men.
	529	Reid Holliday	Medal.
	567	Metropolitan Alum Co.	Medal.
	568	G. Miller and Co.	Medal.
	581	Perkin and Son	Medal.
	588	Roberts, Dale, and Co.	Medal.
	592	R. Rumney	Medal.
	597	G. Shand	Medal.
	609	Simpson, Maule, and Nicholson	Medal.
Canada	23	Canadian Oil-Works	Medal.
New Brunswick	16	D. Wolfe Spurr	Hon. men.
Austria	89	Dr. Breitenlohner	Medal.
	121	E. Lehner	Hon. men.
	142	C. Polley	Medal.
Bavaria	149	Graf and Co.	Hon. men.
Belgium	42	Coosemans and Berchem.	Hon. men.
France	203	C. Collas and Co.	Medal.
	130	M. G. Dehaynin	Medal.
	124	A. Desespringalle	Medal.
	171	Fayolle and Co.	Medal.
	197	A. Laroque	Medal.
	206	F. Laurent and Casthélaz	Medal.
	117	A. A. P. Mallet	Medal.
	118	Parisian Gas Lighting and Heating Company.	Medal.
	116	F. Peterson and Sichler	Medal.
	115	Poirrier and Chappat	Medal.
	179	Renard Brothers & Franc	Medal.
	184	J. Javal	Hon. men.
Frankfort-on-M.	301	J. Brönner	Medal.
Hesse	466	K. and R. Ochler	Medal.
	467	Petersen and Co.	Hon. men.
Netherlands	5	Van der Elst and Matthes	Medal.
Prussia	977	Georg-Hütte	Medal.
	751	Dr. Bernhard Hübner	Medal.
	992	C. Jäger	Medal.
	1009A	Dr. Professor Runge	Medal.
	831	Sächsisch Thüringische Actien Gesellschaft	Medal.
	877	Wierschen Weissenfels Actien Gesellschaft	Medal.

Prussia	957	O. Bredt	Hon. men.
	828	Ruge	Hon. men.
Saxony	2304	Duvernay, Peters, and Co.	Medal.
	2312	T. Würtz	Medal.
Switzerland . .	16	J. J. Muller and Co. . .	Medal.
United States .	5	S. F. Pease	Medal.
Würtemberg . .	2687	R. Knosp	Medal.

PHOTOMETERS.

United Kingdom	2973	W. Sugg	Medal.
Prussia	1395	S. Elster	Medal.

PIPES AND JOINTS.

Belgium. . . .	310	V. Delperdange	Medal.
France	1189	Fortin-Hermann Brothers	Medal.
	—	M. C. Sebille	Medal.

VALVES.

United Kingdom	2261	E. Cockey and Sons . .	Medal.

It will be observed, that the jurors have distributed their awards with very different degrees of liberality among the exhibitors of different classes of goods. Thus, while the exhibitors of clay retorts, gas-making apparatus, gas-fittings, and meters, have had a sparing allowance of medals and honourable mentions, these honours have been indiscriminately showered down on the exhibitors of tar products. It can scarcely be supposed that this great disproportion is attributable to difference in the degrees of merit in the classes of articles exhibited, and the want of uniformity in the decisions of the juries tends to throw discredit on their awards in general.

The Tramways Bill has been reported by the select committee considerably altered in its details, but, without such protection for gas and water-works as will insure them ready access to their mains and services. It stands for further consideration this evening, in committee of the whole House, but Mr. Dillwyn has given notice of a motion that the House wil resolve itself into such committee on this day three months, the effect of carrying which motion, will be to shelve the Bill for this session. The railway companies, are, we believe, dissatisfied with the Bill in its present form, and the gas and water interest will probably unite with them, in obtaining further time for the consideration of the subject.

A dispute has arisen between the Sheffield Gas Company and the Highway Board, with respect to the carrying out of the Sales of Gas Act, which has created much excitement in the town. The company are bound by their special Act to supply gas to any person requiring it within seven days of being requested to do so; and their Act, passed in 1855, also provides that, if the consumer find his own meter, it shall be approved by the company before it is used. That clause of the Act has, however, been virtually repealed by the Sales of Gas Act, the 16th section of which enacts that every consumer of gas may purchase and use for the measurement of the gas supplied to him any meter duly stamped. The company, nevertheless, conceived that they retained the power of approval, and they refused to supply the Highway Board with gas unless the meter that had been provided, and duly stamped, were sent to their office to be tested. A public meeting was held on the subject, the proceedings of which are fully reported in another column, and the question was subsequently brought before the magistrates; an information having been laid against the gas company by the Highway Board, and penalties were sought to be enforced of 20s. for each day that the supply of gas was withheld. At the meeting, it was contended on behalf of the company, that many of the meters tested and stamped by the inspector registered very incorrectly, and that the company were justified in requiring to have all the meters examined by their own officers, before being fixed. But, when the question came before the magistrates, the company's solicitor abandoned such pretext, and relied altogether on technical objections. The magistrates decided that the section of the special Act which gave the company the power of approval had been virtually repealed by the 16th section, and by other provisions, of the Sales of Gas Act, and they convicted the company, but the chairman stated at the same time that, if the two parties could arrange terms between themselves, the conviction would be suspended. We trust that this decision will put an end to the dispute, which it is to be regretted the gas company should have been so ill-advised as to have raised. They ought to have known that a public Act of Parliament overrides a private one, and the Sales of Gas Act expressly provides, in the 21st section, for the settlement of any difference respecting the correctness of a meter, by giving the magistrates power to have it re-tested by two inspectors of neighbouring districts, whom they may name. Gas companies should, however, bear in mind that, where the Sales of Gas Act has been adopted, they have no power to remove a meter belonging to a consumer for the purpose of testing it at their own works, nor have they any right to inquire whether the gas passing through it exceeds at any time that marked upon it as its measuring capacity per hour. The law prescribes the manner in which such a meter is to be tested in the event of its accuracy being questioned, and the consumer may burn through it all the gas which the pressure in the company's mains will enable him to obtain. On the other hand, where the meter is the property of the company, and is let out on hire to the consumer, they can test its accuracy before fixing it, and are justified in satisfying themselves that the duty it is to be called upon to perform is not in excess of its legal capabilities.

The lord of the manor of Chippenham has, we are informed, commenced an action against the chairman of the Chippenham Gas Company, to recover compensation for damages in consequence of gas-pipes being laid under the surface of the streets within the said manor, without statutory authority. This is another phase of the many complicated questions which have arisen with regard to highways, in consequence of their having been broken up, or interfered with by parties without legal powers, and though there is, we believe, no precedent for such proceedings on the part of a lord of a manor, with regard to a gas company, we apprehend that an action may be maintained. The damages accorded will probably be nominal, but the effect will be to preclude the company from extending their mains and service-pipes, or from repairing them, till they obtain statutory powers.

Our attention has been called to an alleged error which appears in the report published in our last, of the case of the *Equitable Gas Company v. Probert*, heard before Mr. Tyrwhitt, the magistrate at the Marlborough Police Court. The case was not reported by our own special reporter, whose accuracy is universally admitted, but, by an occasional one; and, it is alleged, that the magistrate never expressed any doubt as to his jurisdiction in the matter, whereas, the contrary is stated in the report of the proceedings on June 18th. A few other minor inaccuracies are also pointed out, but none of them of sufficient importance to call for correction.

The satisfactory manner in which the metropolitan gas companies are fulfilling the duties imposed upon them by the Act of 1860, is proved by the repeated instances in which the district boards have resolved to dispense with the services of the "chemical examiners of gas," appointed under the Act. In the annual report just issued by the Board of the Strand district, it is stated that, "in the report of last year, the ratepayers were informed that Dr. Conway Evans had been appointed chemical examiner of gas for the district, under the Metropolis Gas Act 1860, 23 and 24 Vict. cap. 125. From his several reports, the Board was satisfied that the gas companies had fairly complied with the requirements of the Act, both as to the illuminating power and the purity of the gas supplied. The Board has not deemed it necessary to reappoint a chemical examiner of gas for the ensuing year."

As we propose reprinting, in our next number, the quarterly Share-Lists of Gas and Water Companies, we shall be obliged by our readers pointing out any change which may have taken place, of which we have not been already advised, in the paid-up capital, dividends, or value of shares, since the publication of the last list on the 22nd of April last.

Correspondence.

GAS-METERS: WET AND DRY.

SIR,—I had hoped that some one more capable than myself would have questioned the newly-propounded theory of Mr. Rutter, relative to the "science of meter-making;" the contrary, however, being the case, I venture to offer a few observations on the subject.

Mr. Rutter, in his communications which appeared in the JOURNAL OF GAS LIGHTING, gives an account of a series of chemical and electrical experiments, together with various arguments, in order to establish the theory that gas-meters became galvanic batteries, and that by the agency of electricity certain parts of them are speedily destroyed.

I believe, it is generally admitted that to deprive gas entirely of its ammonia, would cause a continuous accumulation of naphthaline in the mains and services; this is a forcible reason why that

compound should exist to a limited extent; and it may, therefore, be asserted that some ammonia always passes with the gas to the consumers.

The water in the meter has a great affinity for ammonia, which it absorbs rapidly from the gas in its passage, forming a solution of the alkali, the strength of which depends on the quantity and purity of the gas passed.

The shafts, spindles, bearings and worms, of consumers meters are made of an alloy of copper and tin (not zinc, as erroneously stated by Mr. Rutter); the ammonia in solution has a great affinity for copper, and comparatively slight affinity for the alloy of copper and tin; to illustrate this, take a piece of pure copper, and a piece of meter-shaft (if new, the better), both of about the same dimensions; place each in a separate phial filled with solution of ammonia, when, in two or three days, the pure liquid will become a deep blue, that containing the copper being the darkest colour, in consequence of the action being more violent; if these be kept for months, and occasionally supplying fresh ammonia, it would be seen that the copper has suffered most severely, whilst the alloy is comparatively untouched.

These facts will show that the metals are acted on chemically, and that two metals being alloyed, although "antagonist to each other," are not destroyed by electricity, as stated by Mr. Rutter, but purely by chemical decomposition—the tin, not being affected by ammonia, preserves the copper with which it is intermixed. It might be urged that a piece of brass (copper and zinc), subjected to the same experiment, would be destroyed with more rapidity than even the copper alone; but this would not indicate electrical influence, but simply show that ammonia has still a greater affinity for the zinc, and so causes the rapid decomposition thereof.

Mr. Rutter refers to the soldered seams of meter-wheels giving way, which he also attributes to electricity, but shows no reason why. I think, it may be with more justice attributed to the presence of bismuth with the solder (which was formerly very frequently employed), which metal may be acted upon by the sulphur in the gas, so causing the solder to be brittle, and break.

The phenomena described by Mr. Rutter, of an inflammable deposit being found on some of the old meter-wheels, and which he attributes also to electricity, I submit is purely chemical, the compound being the ammonia nitrate of copper, a very explosive substance when dry, and which, in the early period of gas lighting, was found in the copper tubes then used for fittings, and was the cause of many severe accidents.

If the theory of destruction by electricity be good, it would be so in all cases: the station-meter, with its cast-iron case, iron shaft, and metal wheel, would, in a like manner, become a galvanic battery: the iron would represent one plate, and the white metal the other, and the latter being the most feeble however slow the action, would, in the course of years, manifest the effects of electricity on its surface, but my experience convinces me that if the tar-deposit be cleaned off the white metal, no effects of galvanic action will be seen thereon.

In one thing I agree with Mr. Rutter, that is, the metal employed for the shafts, &c., is not the most suitable, but I do not think his proposition advisable, to make them of iron or steel. The circumstances attending a station-meter and a consumer's meter, are very different; the station-meter once placed is continually in work, but the consumer's meter may be in use three months, and then remain inactive double that period: the results of this inactivity would be—the worm and wheel, or shafts and bearings, or all, would be held fast by the oxidation of the iron. This has been the theory hitherto against the use of iron for this purpose, but I have not seen it applied in practice.

The observations made as to the durability of iron are applicable with greater force to white metal, whilst the evil effects of oxidation are avoided.

I, therefore, consider an alloy of tin, which would resist the impurities of gas, and, at the same time, be sufficiently hard, would be most desirable for shafts, bearings, &c.; but, the difficulty now is expense, for it happens that the metals necessary to form the desired alloy are very expensive, and it would be difficult to convince gas companies of the advantages, so to induce them to pay a price for the instruments compatible with the extra outlay incurred, and this, I believe, to be the impediment to progress in the construction of the parts alluded to.

In conclusion, I was surprised that in the communication in question, the compound ammonia I have so often referred to was not mentioned; if it had been, it would materially have altered the arguments offered by Mr. Rutter. WILLIAM RICHARDS.

Clerkenwell, E.C., July 12, 1862.

SURREY GAS COMPANY AND ST. OLAVE'S PARISH.

SIR,—Parish boards are so many Parliaments, where (in both cases) true statesmen plead for the public weal, without personal motives, and demagogues talk for notoriety and vain glory. The St. Olave's Board have lately exhibited great jealousy of the Commissioners of Sewers, lest this latter body should run off with all the honours of *agitation* on the great gas question; and they have, accordingly, been making frightful contortions to attract public attention to their seat of wisdom.

It appears that Mr. Croll, whilst contractor for the Surrey Gas Company, allowed the St. Olave's Board to light and extinguish their own lamps, the charge meanwhile, being so much per lamp per annum. Practice showed that St. Olave's lamps were uniformly the *first* to be lighted, and the *last* to be extinguished! When the Surrey Gas Company took their works into their own management, they gave notice to St. Olave's that, unless the parish chose to burn by meter, they (the gas company) must control the lighting and extinguishing of the public lamps. Here was a chance for the agitators not to be neglected. Dictation! Monopoly! Extortion! and thunder-bolts—such only as can proceed from "constituted authorities," burst forth from the raging elements of St. Olave's fiery furnace.

St. Olave's writes to the gas company, and *demands*—

1. To be supplied with gas by meter.
2. To have *one* meter to every *twelfth* lamp.
3. To be charged 3s. 3d. per 1000 feet.
4. To have the price submitted to arbitration, if 3s. 3d. per 1000 be refused!

To these very modest demands, the gas company reply;—

1. We will supply your lamps by meter.
2. We require that the meters be so placed that every foot of gas be *intercepted* between supply and consumption, so that the *quantity passing* may find numerical expression! We say that "burning by meter" implies that *all* gas must pass through a meter to be measured! That taking the quantity burned by *one* lamp, and applying that to *twelve*, is not reckoning by meter but reckoning by computation. You may have as many meters or as few as you choose, attaching one meter to a lamp, or a meter, common to twenty lamps, so that all the gas actually consumed be actually measured.
3. We will charge you 4s. per 1000 feet, that being "the lowest rate" we charge "to any private consumer," which is the price fixed by Parliament for public lamps, by clause 37 of the Metropolis Gas Act, 1860.
4. We are quite ready to go to arbitration, but, we say that the *only* question to arbitrate, is whether 4s. be "the lowest rate" we charge to "any private consumer." If you think the Act of Parliament gives power (as your reported speeches indicate) to an arbitrator to decide what may be a fair and reasonable price—whether 3s. 3d., or 3s. 6d., or 4s., or 4s. 6d., or what not—you are simply mistaken. The Act of Parliament gives no such powers. On the contrary, it *fixes the price*, stating that when public lamps are lighted by meter, that price shall be the "lowest rate to any private consumer."

Such are the points, or rather such is the point at issue between these parties. We will not insult the Legislature by supposing it capable of giving parishes power to light and extinguish lamps, without measures of protection to the gas company; or giving parishes power to dictate the price at which gas shall be supplied to them. There is clear equity to both parties in the provisions of the Metropolis Gas Act 1860, and the only thing to be said, is that St. Olave's have not, so far, had the discernment to discover that equity. N.

July 14, 1862.

Register of New Patents.

2540.—CHARLES NOYES KERNOT, of Gloucester House, West Cowes, I. of Wight, gentleman, and MARTIN DIEDERICH RUCKER, of 116, Fenchurch Street, London, gentleman, for "*Improvements in the method of obtaining ammoniacal salts, and other valuable products, from liquors or substances containing ammonia, and for utilizing the residuum.*" Patent dated Oct. 11, 1861.

This invention has for its object the obtaining ammoniacal salts and other valuable products without the application of heat, from all liquors or substances containing ammonia, as urine or any other ammoniacal liquor. The liquor (or in case of substances or solution thereof) is to be placed in a suitable vessel or tank together with crude sulphate of zinc, about 4 lbs. to the 200 gallons of urine, or any other ammoniacal liquor; or other sulphates may be substituted for the sulphate of zinc; or a liquid specially prepared from animal or mineral substances, as bones and other phosphites of lime and magnesia, coprolites, apatite, or other mineral phosphates acted on by a weak solution of acids. Of this solution there is added a sufficient quantity to precipitate all the ammonia contained in the urine or any other ammoniacal liquor used; the clear liquid can then be drawn off or filtered, and the solid portion used as a fertilizing agent, or for making sulphates, muriates, and other salts and liquids of ammonia.

The claim is for the precipitation of ammonia and obtaining its salts, and other valuable products from solutions or substances containing ammonia, by sulphate of zinc or other sulphates, and by solutions prepared from bones and other phosphites of lime and magnesia, coprolites, apatite, phosphorite, or other mineral phosphates, with hydrochloric, sulphuric, or other acids.

2554.—MATTHEW CARTWRIGHT, of Carlisle, Cumberland, dentist, for "*Improvements in stench-traps.*" Provisional protection only obtained. Dated Oct. 12, 1861.

This invention relates to certain improvements in stench-traps applicable to water-closets, sewers, and sinks, and consists in covering the closing plate or trap either wholly or partially on its closing side with vulcanized india-rubber alone, or in combination with other suitable materials, a

similar covering being applied to the surface upon which the flap closes, so that a perfectly tight joint is obtained, which will preclude the possibility of any stench or effluvium passing or escaping through it. This joint may be so disposed as to form a species of tongue and groove, the one surface having a groove or channel formed in it, and the other a corresponding raised rib or projection fitting into the channel, one or both surfaces being covered with elastic packing material. When applied to a water-closet the hinged lid or flap has a weighted lever attached to it, which keeps it closed against the bottom of the pan when not in use. According to one arrangement applicable to sinks and sewers, a cylindrical box or case is used having a lid or cover (packed with india-rubber) screwed down thereon by means of a central screw-spindle and handle so as to exclude all effluvia.

2567.—William Ross, of Glasgow, Lanark, N.B., brassfounder, for "*Improvements in constructing taps or valves.*" Patent dated Oct. 15, 1861.

This invention relates to a simple, durable, and economical mode of constructing and arranging the parts of taps or valves. In one modification of the improved taps or valves a cylindrical chamber is formed at right angles to or across the fluid-way, and the inlet into and outlet from this chamber are opposite to each other, or at the same level. In the chamber there works a plug, which in shape is as it were cut away on the sides at the part between the inlet and outlet, but having a middle diaphragm extending quite across. The longitudinal edges of this diaphragm are packed with pieces of suitable soft but tough material, such as leather, and these two packing strips meet and join upper and lower rings or washers of similar material. When the plug is turned, with its diaphragm in the line of the inlet and outlet-openings, the fluid can pass through on each side of the diaphragm; but, when the plug is turned with the diaphragm across, the passage through is closed by the packed edges of the diaphragm, whilst the rings or washers prevent leakage towards the ends of the plug-chamber.

The improved tap or valve may easily be modified for three or more ways, by forming the acting part with the requisite number of vertical partitions packed at their edges like the single diaphragm. The plug may be contrived to be actuated in various ways, a simple plan being to form it with an external handle, the plug being inserted in one end of the plug-chamber left open for the purpose, and being held therein by a pin screwed through the side of the chamber into a groove formed for it round the neck of the plug. In a further modification, the outlet may be formed longitudinally through the plug itself.

2598.—Charles Herbert Holt, of Huddersfield, in the co. of York' engineer, for "*Improvements in steam-engines and boilers, and in apparatus connected therewith, part of which improvements is also applicable to raising and measuring fluids generally.*" Patent dated Oct. 18, 1861.

The first, second, fourth, and fifth sections, refer to the employment of this invention to steam-engines and boilers.

The improvements relate, thirdly, to applying packing to rotary pumps or meters formed by the rotation together of two toothed or corrugated surfaces in a chamber, such packings being forced down inclined planes against the revolving-wheels by springs or other elastic medium.

2607.—James Webster, of Birmingham, Warwick, engineer, for "*Improvements in manufacturing oxygen gas, and obtaining certain other products.*" Patent dated Oct. 19, 1861.

This invention consists of a mode of treating a mixture of nitrate of soda or other nitrate, with an oxide of iron or burnt oxide of zinc, for the purpose of obtaining oxygen gas, nitrogenous compounds, and the base of the salt employed. For this purpose, the mixture is submitted to distillation in an iron or other proper retort; the nitrogenous compounds contained in the gaseous products of the distillation are condensed in water, or in any other convenient manner, and those compounds are thus separated from the residue of the gaseous products, consisting chiefly of oxygen gas, which is collected in a proper receiver; the residuum in the retort at the end of the process contains the base of the salt employed, which, if it be an alkali or alkaline earth, will be in a caustic state.

The invention is performed and carried out as follows:—One part of the nitrate of soda, and two parts of the sesquioxide of iron or burnt oxide of zinc, are mixed well together; the mixture is thrown into a red-hot retort, the lid of which is then luted in its place, and the heat kept up: the gas generated is conveyed by a pipe into a condenser, where it is passed through water to extract the nitrous gas and through another similar condenser for the like purpose, and thence to a chamber which contains a number of perforated trays on which is placed spent material from the generator, after having been moistened with water or steam. This acts as a purifier, and removes all nitrogen gas that may be with the oxygen. The gas then passes into the gasometer. After the gas is all given off from a charge of material in the generator, the spent material is removed, and, after moistening it with steam or water, it is placed upon trays in the purifier, and after a few charges of gas have passed through it, it is removed to another chamber fitted with trays having an opening near the bottom for a draught hold, where it is exposed to fumes (in preference from metallic iron, nitric acid placed on a vessel at the bottom of the chamber). In a short time when the acid ceases to act it is withdrawn, the process forming binoxide of nitrogen, which instantly takes up oxygen from the atmosphere and converts the soda in the trays into nitrate or nitrate of soda, which process is aided by a draught being formed by connexion with a flue (or by other means). The residue from the manufacture of the gas is also utilized by throwing the said spent material from the generator, whilst hot, into water and crystallizing the undecomposed nitrate of soda (and perhaps some nitrate of soda) from it. The remaining liquor containing caustic soda may be further boiled down to hydrate of soda for soap-boilers and others. The oxide of iron or burnt oxide of zinc will precipitate, and may be used again with other nitrates for the manufacture of gas: in this case the nitrogenous acid is not required and may be sold or used for other purposes, or the caustic soda solution may have the acid from the first condenser (with perhaps a little nitric acid added) when more nitrate of soda may be crystallized from it, but it is preferred to expose the spent material from the gas to a draught in a chamber with trays as before stated, or to make the caustic soda solution for sale and retain the nitrate of soda and the oxide of iron or burnt oxide of zinc for generating gas.

The claim is for obtaining oxygen, nitrogenous compounds, and the base of the salt employed, or burnt oxide of zinc, in the manner before stated.

2615.—John Wainwright, of Connaught Place West, Middlesex, dental surgeon, for "*Improvements in ventilating rooms and buildings.*" Provisional protection only obtained. Dated Oct. 19, 1861.

This invention is for improvements upon a former patent, and consists, first, in perforating the lower bar of the lower sash of window-frames, and in fitting over the same inside the window a slide made with perforations and solid parts, in such manner that the perforations in and solid parts of the slide may be brought entirely or partially over the apertures in the sash-bar. In some cases, the air is received in a case or trough through apertures in the lower sash-bar, and tubes are carried up the side-frames, which communicate with the air-case, and outlets are provided in the tubes at various levels. The upper sash-frame remains as described in the specification of the former patent.

2618.—Frederic John Evans, of the Gas-works, Horseferry Road, Westminster, gas-engineer, for "*An improved mode of and apparatus for carburetting gases for the purpose of illumination.*"

The object of this invention is to effect the carburetting of gaseous bodies, and thus to impart thereto illuminating properties, or to heighten the illuminating properties which they may already possess. This end it is proposed to attain by passing the gaseous body intended to be carburetted through a suitable arrangement of heating apparatus, and while in a heated state leading it off to a vessel containing any easily volatizable hydrocarbon. As the gas passes through this vessel the hydrocarbon will be vapourized and combine with the heated gas, whereby the requisite illuminating power will be imparted thereto. The mixed gas may then be led off to a burner to be consumed. The form of apparatus which it is preferred to employ for heating the gaseous body, consists mainly of a closed annular chamber formed by two inverted cylinders of different diameters, arranged concentrically and closed at top. This chamber is mounted on short pillars to permit of access of air to the interior of the inner cylinder, which forms a combustion-chamber. The inner cylinder is open at bottom to the atmosphere, and is made slightly conical at that part to increase its diameter. An outlet-pipe fitted to the top of this chamber, and passing through the removable cover of the annular chamber, is employed for ventilating the combustion-chamber. Projecting into the combustion-chamber is a Bunsen or other suitable gas-burner for imparting the requisite heat to the apparatus. The bottom edges of the two cylinders are provided with flanges, which flanges are connected together by bolts and nuts so as to close the bottom of the annular chamber. Near the bottom of this chamber a union joint is fitted for admitting gas thereto, and at the top of the chamber is a similar union joint to allow of the escape of the gas. The annular chamber is packed with iron borings or other good heat-absorbing material, removing for that purpose the cover which, when the chamber is filled, is to be replaced and made secure by screws. The gaseous body intended to be carburetted, whether it be atmospheric air or a weak illuminating gas, is then caused to percolate through the heat-absorbing medium. After passing through this apparatus, the temperature of the chamber being raised to and maintained at from 60° to 160° Fahr. (according to the quality of hydrocarbon used) by the flame of the gas-burner, the heated gaseous body will be ready to enter the vessel containing the hydrocarbon. The heat of the gaseous body acting on the hydrocarbon (that which it is preferred to use being coal-tar naphtha) will vapourize the same, and a combination instantly taking place a luminous gas will result as above explained.

The claims are for—

1. Passing gaseous bodies while in a heated state through vessels containing liquid hydrocarbon for the purpose above explained.

2. The construction of apparatus above described for heating the gaseous bodies intended to be carburetted.

2635.—Herbert Frost, of Manchester, manager of the Manchester Water-Meter Company, Limited, for "*Improvements in apparatus for measuring fluids.*" Patent dated Oct. 22, 1861.

These improvements consist, firstly, of an improved piston for fluid meters, the packing-rings of which are sprung into grooves formed in the periphery of the piston-plate, or the ring may be formed with an internal groove and sprung on the edge of the piston-plate. The rings are also made to spring outwardly by their own elasticity for keeping themselves as well as the joint-bit in contact with the interior of the cylinder. Their form also permits the fluid to act inwardly and directly upon them for the same purpose.

Secondly, in an improved valve consisting of a moveable plate for covering the ingress and egress ports, and a moveable cover or chamber fitting on a rib or midfeather cast, or fixed on the plate. By this contrivance, the fluid is made to reverse the position of the plate, and thus to change the course of the fluid passing through the ports without the aid of the additional valve, and without the flexible or other packing described in the specification of letters patent granted to the present patentee in conjunction with David Chadwick, on the 28th of April, 1857, No. 1200.

Thirdly, in an improved apparatus for measuring fluids, consisting of a moveable chamber or box sliding on a flat plate or in an angular trough, the said chambers being kept in contact with the surfaces on which they move by their own gravity. The chambers are moved to and fro on the surfaces by the fluid which is being measured acting against a stationary division-plate, which forms a partition between the fluid which is entering the chamber and that which is escaping therefrom.

Fourthly, in working the indicating ratchet-wheel by a lever with a moveable stud in a slot for regulating the length to be travelled by the said lever according to the quantity of the fluid that is being measured, and by the application of two or more catches working in the ratchet-wheel for avoiding the back lash of the teeth, thus insuring greater accuracy of registration.

Fifthly, in placing the indicating-wheels and dials within the case of the meter under a glass, the object being to dispense with the stuffing-box now required for the rod, by which motion is conveyed to the indicator; in this case, the glass may serve as the dial.

2657.—William Barry Lord, of the Royal Artillery, veterinary surgeon and first lieutenant, now residing at Plymouth, Devon, for "*An improved plug and socket, or apparatus, for closing and opening passages for the flow of liquids and fluids.*" Patent dated Oct. 23, 1861. This invention consists in the adaptation of a grooved ball to a seating, socket, or bearer, in such wise that when the ball is by means of the short handle pressed down at one end of the seating-frame, liquids and gases are freely admitted; and, when the handle is raised traversing a radius, and is made to descend to or over the other end of the seating-frame, or bearer, liquids and gases are effectually shut off or excluded. If the edge of the groove in the ball in its traverse from open to shut meets with any minor impediment, such as bits of string, stick, &c., it severs the obstruction and attains its proper position, and this power of forcing through obstructions is considered very important. The ball-apparatus is attached to, and forming as it were part of the handle or lever, but the ball may be made separate and only worked on by the lever, and it may work rigidly or loosely as the quadrant-shaped bridge may be tightened or loosened by screws threading into the bearer. The bridge is made almost in two parts, or, in other words, a longitudinal slot; the width of the lever-rod is cut down to the flanges in which the screw-holes are threaded, and on which the screw-heads rest, and through this slot the lever traverses from one side to the other. It is well known that almost every arrangement for the influx or outflow of liquid is liable to be rendered useless by frost. From the peculiar construction of this plug, it is evident it will operate when the usual contrivances are closed up by that power, even if it ever yields under its influence.

APPLICATIONS FOR LETTERS PATENT.

1891.—Alexander Angus Croll, of Coleman Street, London, E.C. engineer, for "*Improvements in the treatment of ammoniacal liquor of gas-works.*" June 27, 1862.

1905.—Joseph Wale, of Liverpool, Lancashire, plumber, and Thomas Dodd, also, of Liverpool, glass-merchant, for "*Improvements in taps for controlling the flow or passage of fluids.*" June 30, 1862.

1914.—John Parkinson, of Bury, Lancashire, engineer, and John Marsland, of Newchurch, in the same county, engineer, for "*Improvements in apparatus for regulating the flow and pressure of steam and other fluids.*" July 1, 1862.

1920.—Jesse Greenhalgh, of Hyde, Lancashire, mechanic, and James Greenhalgh, of Audenshaw, Lancashire, farmer, for "*An improved diminishing-valve, and also a water or steam-escape apparatus to give alarm in case of fire, and to assist in quenching the same.*" July 1, 1862.

1934.—James Webster, of Birmingham, Warwickshire, engineer, for "*Improved apparatus for the manufacture of gas for illumination.*" July 2, 1862.

1940.—William Mattieu Williams, of Handsworth, Staffordshire, teacher, for "*Improvements in apparatus for the distillation of coal and peat, and such other substances as may be used for the manufacture of solid and liquid volatile hydrocarbons.*" July 3, 1862.

1953.—Arthur Warner, of 31, Threadneedle Street, London, E.C., for "*Improvements in preparing materials for, and in purifying coal-gas.*" July 5, 1862.

1955.—Joshua Kidd, of Cannon Row, Westminster, London, S.W., engineer, for "*Improvements in gas-meters.*" July 7, 1862.

1957.—Thomas Edwards, of Liverpool, Lancashire, gas engineer, for "*Improved movement for the indices for gas, water, and other fluid-meters.*" July 7, 1862.

1958.—James M'Geary, of Salem, Massachusetts, U. S., now residing at Bayham Terrace, London, W., for "*Improvements in the manufacture of gas, and the apparatus to be employed for that purpose.*" A communication. July 7, 1862.

1961.—John Henry Johnson, of 47, Lincoln's Inn Fields, London, W.C., and of 166, Buchanan Street, Glasgow, N.B., gentleman, for "*Improvements in wet gas-meters.*" A communication. July 8, 1862.

1989.—Edward John Biddle, of the city, county, and State of New York, U.S., now residing at the Grosvenor Hotel, Pimlico, London, S.W., engineer, for "*The use of petroleum or coal-oil as fuel, and also for the machinery and apparatus to be employed for that purpose.*" July 10, 1862.

1992.—Daniel Steele, of Bunhill Row, Finsbury, London, E.C., builder's foreman, for "*Improvements in the method of flushing, or distributing the water in pans or basins applicable to water-closets, urinals, wash-hand basins, or other purposes.*" July 10, 1862.

GRANTS OF PROVISIONAL PROTECTION.

1722.—Arthur John Joyce, of Cambridge Terrace, London, W., gentleman, for "*Improvements in lighting, and heating.*" June 9, 1862.

1749.—Auguste Aimé Lerenard, of 60, Boulevart de Strasbourg, Paris, practical engineer, for "*A new and improved cement or mastic for making joints of steam, water, or gas-pipes or chambers.*" June 12, 1862.

1805.—Andrew Howat, of Farnworth, near Bolton-le-Moors, Lancashire, brass-founder, for "*Improvements in the construction of water-gauges and blow-off taps for steam-boilers, and other purposes.*" June 19, 1862.

1815.—Joseph Gustave Dupuch, of Paris, brassfounder, for "*Improvements in cocks for regulating the supply of gas.*" June 20, 1862.

1822.—Joseph Walter Taylor, of Newsome, near Huddersfield, Yorkshire, manufacturer, for "*Improvements in valves, and in means for regulating and indicating the flow and pressure of fluids.*" June 20, 1862.

1834.—Stephen Holman, of 18, Cannon Street, London, E.C., engineer, for "*Improvements in pumps and valves.*" June 21, 1862.

1849.—Abraham Ripley, of Brook Street, West Square, Lambeth, London, S., engineer, for "*Improvements in the construction of damper-governors or regulators.*" June 24, 1862.

1884.—Edward Hunt and Henry Davis Pochin, both of Salford, Lancashire, chemists, for "*An improved condensing apparatus.*" June 27, 1862.

1934.—James Webster, of Birmingham, Warwickshire, engineer, for "*Improved apparatus for the manufacture of gas for illumination.*" July 2, 1862.

1940.—William Mattieu Williams, of Handsworth, Staffordshire, teacher, for "*Improvements in apparatus for the distillation of coal and peat, and such other substances as are or may be used for the manufacture of solid and liquid volatile hydrocarbons.*" July 3, 1862.

NOTICES TO PROCEED.

444.—William Davis, of Spencer Road, Stoke Newington, London, N., oil-refiner, for "*Improvements in increasing the illuminating effect of coal-gas, and other gases.*" Feb. 19, 1862.

523.—Thomas King and Robert Varvill, of Liverpool, Lancashire, merchants, for "*Improvements in apparatus for controlling the flow of fluids for flushing water-closets.*" Feb. 26, 1862.

533.—Thomas Adams, of Deptford, London, S.E., engineer, for "*Improved arrangements for effecting an equilibrium of the steam-pressure upon valves, the said arrangements being also applicable for effecting equilibrium of fluid or gaseous pressure upon other valves.*" Feb. 27, 1862.

628.—Pierre Joseph Guyet, of Paris, civil engineer, for "*Improvements in water-meters.*" March 8, 1862.

744.—Thomas Myers, of Brighton, Sussex, gentleman, for "*Improvements in meters for measuring water, gas, or other fluids.*" March 17, 1862.

1149.—Alexander Parkes, of Liverpool Street, Birmingham, Warwickshire, for "*Improvements in surface-condensers.*" April 19, 1862.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1510.—Alexis Jean Dessales, "*An improvement in the working and securing of sliding-tubes applicable to gas-chandeliers, lamps, and other purposes.*" June 23, 1859.

1528.—John Roberts, "*Improvements in filters.*" June 25, 1859.

1549.—William John Thompson Williamson, "*Improvements in gas-burners.*" June 29, 1859.

1594.—William Knapton and Adam Aitchison, "*Improvements in the manufacture of gas.*" July 5, 1859.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

1454.—Auguste Edouard Loradoux Bellford, "*Certain improvements in rotary blowing-machines, which are also applicable to rotary-pumps, to rotary-engines, to be driven by steam or other fluids, and to meters for measuring the flow of fluid bodies.*" June 26, 1855.

1480.—Auguste Edouard Loradoux Bellford, "*Improvements in manufacturing, lighting, and heating gases.*" June 28, 1855.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, June 30, 1862.

The following Bills received the Royal Assent:—The Stretford Gas the Windermere District Gas, the Caterham Water-Works, the Reading and Reading Union Gas Companies, the Wakefield Water, and the Liverpool Corporation Water.

The Kent County Gaol and Lunatic Asylum (Water Supply) Bill was reported, without amendment.

The Aberdeen Police, Water, &c., Bill, was read a second time, and committed.

Thursday, July 3.

The Kent County Gaol and Lunatic Asylum (Water Supply) Bill was read a third time, and passed.

The Police and Improvement (Scotland) Bill was read a first time.

Monday, July 7.

The Royal Assent was given to the Kent County Gaol and Lunatic Asylum (Water Supply) Bill.

Tuesday, July 8.

The Police and Improvement (Scotland) Bill was read a second time, and committed.

Thursday, July 10.

The Salford Improvement, the Glasgow Police, and the Aberdeen Police, Water, &c., Bills, were referred to a Select Committee, consisting of the Earl of Powis (chairman), the Earl of Yarborough, Lord Fortescue, Lord Wynford, and Lord Wenlock, who will sit on Monday, the 14th inst., at eleven o'clock.

HOUSE OF COMMONS.

TUESDAY, JULY 1, 1862.

The POLICE AND IMPROVEMENT (SCOTLAND) Bill, as amended, was considered, amendments made, and ordered to be read a third time.

WEDNESDAY, JULY 7.

The POLICE AND IMPROVEMENT (SCOTLAND) Bill was read a third time, and passed.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 19.

(*Before Lord* LOVAINE, *Chairman; Sir* PHILIP EGERTON, *Sir* EDWARD FILMER, *Mr.* HADFIELD, *and Mr.* REPTON.)

ABERDEEN WATER-WORKS EXTENSION.

Mr. HOPE SCOTT, Q.C., Serjeant BELLASIS, and Mr. LOCH, appeared on behalf of the promoters. Mr. CALVERT, Q.C., and Mr. FORSYTH opposed for the proprietors of fisheries on the river Dee; and Mr. MUNDELL also opposed on the part of Sir James Burnett, a landowner at Cairnton.

Mr. HOPE SCOTT stated the case. He said this was a bill of a very general nature, having for its object the paving, lighting, and watching of the city of Aberdeen, the supplying of that place with water, and for other purposes. The dissension in the present case would lead to next to nothing, except with regard to water. By an Act passed in 1829, the power of supplying water was vested in the commissioners of police, and the present bill did not propose that any alteration should take place with respect to the body who were to govern the general local affairs of the city. The town council cordially concurred with the police commissioners in promoting the present bill. The boundaries of Aberdeen were not coincident. There were three of these boundaries, each different from the other, and the bill did not propose to alter the existing police and municipal boundaries in any form; but, so far as water was concerned, it granted a power extending beyond the police boundary. Aberdeen had been increasing considerably. The rack-rental of 1831 was £60,000 per annum; that of 1861, was £110,832. The population in 1831, was 43,500; that of 1861, was 62,000. The state of the water question in Aberdeen was this: before the year 1829, the supply was from wells near the city. After a great deal of discussion, a new source was resorted to from the river Dee. Water was then and since taken from a place about two miles from Aberdeen, and, following the banks of the river, that water was taken and pumped from a reservoir for the supply of the city. The 65th section of the Act of 1829 specified that the diameter of the first set of pipes should not exceed 24 inches, and the diameter of the second set of pipes 15 inches, and that the quantity of water conveyed to Aberdeen should not be so great in depth as to lessen the Dee more than half an inch from the surface. Then it went on to say that a proper gauge should be kept, and that if the water should be drawn off to a greater depth below the surface than half an inch, the sheriff, at the request of a complaining landowner, should be empowered to demand redress. The gauge in question had never been erected. The police commissioners were quite ready to set it up at the direction of the sheriff, but no parties had set the sheriff in motion, probably because the water taken had never lowered the surface of the Dee to the extent of the half inch. The cost of the works in 1829, was £32,000. It was then thought that Aberdeen would never require any more water—that, in fact, it had quite sufficient to supply all its wants. In 1831, the process of affording the supply being then all done by means of pumping, there were 132,480 gallons per day, given in the space of five hours. There were then 43,500 inhabitants in the city, so that that quantity would amount to about 3 gallons for every inhabitant. In 1843, 468,000 gallons were supplied in 17 hours and 40 minutes, by means of continuous pumping, and in that year the pumping power was increased. In 1844, 589,900 gallons were supplied in 14 hours and 15 minutes. The consumption rose, between 1844 and 1850, to 807,300 gallons a day, pumping 19 hours and 11 minutes. In 1856, it rose to 1,057,000 gallons, the pumping occupying 20 hours and 10 minutes; and, in 1861, it rose to 1,158,920 gallons, the pumping occupying 22 hours and 6 minutes; and now it was found that the pumping power could do no more. On behalf of the Aberdonians, he must say that the opportunities of getting water had increased its consumption among them, between seven and eight fold. Finding that the mechanical power was failing, the attention of the authorities of the city was turned to the question of obtaining a new supply; and a scheme for that purpose was commenced so early as the year 1855. In that year Mr. Simpson, the well-known eminent engineer made a report, in which he stated that to enlarge the then means of supply by additional and increased pumping, and to raise that supply to 2½ million gallons, would not be sufficient for the wants of Aberdeen; that it would cost £100,000; that it could not be given upon the gravitation principle; and that, in short, it would be mere stop-gap expedient. The river Don was then inspected, but it was not found to be so pure as the Dee. Other schemes with a view to the principle of gravitation occupied attention; but, in the end, it appeared that the only proper and economical way of supplying Aberdeen with water was to go higher up the valley of the Dee, either to Potarch or to Cairnton, and Cairnton was the place to which it was now proposed to go. Mr. Simpson reconsidered his scheme in 1860, and then a committee was appointed who made a report. The matter was discussed at a public meeting held in Aberdeen, and everybody in Aberdeen then and now believed that the right place had been struck out, that it was the best scheme and the best water. Cairnton was on the north bank of the Dee—about 19 miles above the place from which the present supply was taken. It was 210 feet above high-water mark, and from that point, therefore, the water would flow by gravitation down to Aberdeen. It would be brought by gravitation in a conduit. The plan was, upon the whole, a very simple one; and the total estimate was £89,000. That estimate, however, had been increased, in consequence of certain additional works having been made by reason of a deviation from the main line. It was now £115,000, allowing a surplus for contingencies. The supply now proposed to be taken would be adequate for many years for Aberdeen. They would take 6 million gallons, as a maximum, per day; and of that, 700,000 gallons per day would be returned to the Dee, after serving the purposes of the hydraulic engine, thus leaving 5,300,000 gallons as the daily maximum to be extracted for Aberdeen. The Dee had its source nearly upon the confines of Banff. It drained 900 square miles of country; and its waters were very pure. Generally speaking, it was of full volume, owing to the rains, or gradual melting of the snow upon the adjacent hills; but there was a partial drought occasionally in the months of June, July, and August. The volume of the river was very large. In 1813, the late W. Stephenson estimated that volume, at a place immediately above the tideway, at 66,720 cubic feet of water per minute, which was about 600 million gallons per day. Taking the date upon which he proceeded, and applying it to the more perfect and correct formula which now existed, those 600 million gallons were reducible to 400 million gallons per day, as the ordinary flow of the Dee. Of course, the quantity became less in times of drought. Examinations had been made upon a careful scale of the actual volume in the river. These examinations had extended over a long period, and had reference to the rise and fall of the Dee at various periods. They showed that once in eight or ten years the volume at one particular spot might be supposed to be reduced to 172 million gallons per day, but that the average minimum stood at 266 million gallons. In other words, the ordinary minimum was 266 millions as contrasted with the extraordinary minimum of 172 millions. If these calculations were correct, then it followed that the promoters would take at their maximum only the one-twenty-ninth part of the extraordinary minimum of 172 million gallons, and the one-sixty-sixth part of the ordinary minimum of 200 million gallons. But what was most worthy of remark was this—that, just above the tide way, there was found so considerable an increase in the volume of the water; that the extreme minimum of 172 million gallons would be absolutely represented by 280 million gallons; and he was informed that the abstraction of the 6 million gallons a day from this enormous quantity would not depress the surface by even so much as half an inch. The bill contained powers enabling the promoters to purchase the existing gas-works, for the purpose of lighting Aberdeen. There was, indeed, a general feeling that the commissioners should hold in their hands the supply of gas. The commissioners were, however, of opinion that they had quite enough to do to construct water-works. Nevertheless, clauses have been inserted in the bill, with the general concurrence of the citizens of Aberdeen, empowering the commissioners to purchase them, under certain circumstances. There was no petition from Aberdeen against the bill, with the exception of one relative to the purchase of the gas company's works; but that would involve a very short discussion. There was a separate petition from Sir James Burnett, a landowner; but, it was believed that his opposition would not be factious, and that his petition would simply raise a question upon the estimates. The principal opposition against which the promoters would have to contend was raised by the owners of the salmon fisheries upon the Dee. That opposition did not come from the persons interested in angling who carried on their sports above Cairnton, because, from those above Cairnton, there was only one petition. Between Cairnton and the tideway, there were seventeen proprietors. Of these, seven opposed the bill, and ten did not oppose it. Lower down, greater opposition was discoverable. It would seem as if those who were doing their utmost to destroy the salmon were the most bitter in their animosity towards the citizens of Aberdeen having a proper supply of water. There was not, however, anything like unanimity in their opposition, for the largest shareholder in the raik and stell fisheries—Lord Aberdeen—had not sent in any petition against the bill. One of the principal objections raised against the scheme was that it would prevent the salmon from reaching their accustomed spawning-beds. This, however, was quite a mistake; and, indeed, it would appear manifest, in the course of the evidence, that the interests of the salmon fishers were likely to be as little affected by the abstraction of water from the Dee as it was possible to conceive, even if the promoters were to make an appreciable effect upon the volume of that river; but there would be no appreciable effect whatever, inasmuch as, saying what he had said before, they would not lower its surface by the depth of even half an inch. The salmon fishers next complained that the bill did not propose to give them any compensation. But they seemed to forget that the sixth section of the Water-Works Clauses Consolidation Act met that objection completely. Before the present time, he believed, it was never known that compensation-reservoirs had been asked for by salmon fishers. This was a new claim—an entirely original one—which had been set up, and it must at once and for all be discountenanced. He had now stated the nature of the case, and the opposition: and, believing the scheme to be a wise and a proper one, he had no doubt that, in the end, it would receive the sanction of the committee.

Alexander Anderson, Esq., examined by Serjeant BELLASIS.

I am the Lord Provost of Aberdeen. I was chosen in 1859. That office makes me president of the town council and of the commissioners of police. The population of Aberdeen was in 1800, 27,000; in 1831, 56,000; and, in 1861, 73,700. These are the numbers of the population in the parliamentary borough. They include old Aberdeen, which contains 12,000 inhabitants. If you deduct that 12,000, you will arrive at the population of the police borough. I am chairman of the harbour trust, also, and am enabled to state that the harbour revenue has increased since 1800 up to the year 1830, from £2000 to £12,000, and now it is £28,000. The police rental has also increased from £60,000 to £110,000. There has been a cause for the diminution of the population. In 1849, there was a sort of blight over the linen and cotton manufacture of the town. A good many of the manufacturing population, in consequence, left. The town has nevertheless been increasing, particularly during the last four or five years, and has particularly increased in population during the last ten years. The prosperity of Aberdeen has increased very much indeed during the last seven years, in the wealth of the people. The comfort of the labouring classes has increased very much, also. There is a large increase of building, and the character of the buildings erected is a proof of the general improvement. Tradesmen are building houses beyond the old area of the town. These circumstances have tended, as a matter of fact, to increase the demand for water very much indeed. There has been a marked change in the habits of the people with regard to the consumption of water. In 1806, our population was 27,000, and then they used about 3 gallons a head. In the year 1826, the town was in want of an increased supply. That was prior to obtaining the present Police Act. The population then was about 46,000. The present water-works were intended to give 500,000 gallons a day, and that was considered an excessive quantity. There was a strong opposition to getting our works erected: 500,000 gallons then would give about 10 gallons a day. The new supply came into operation in the year 1832. The first year we supplied 165,000 gallons. After a few years, the whole supply of 500,000 gallons was required; but our treasurer will be able to give you more ample particulars. In 1843, we increased our supply. Again, in 1851, there was a necessity for makign a further increase. The city of Aberdeen stands upon two very different levels, one much higher than the other. One is probably about 500 feet above the level of the sea. The town is now extending to places not reachable by the present water-works. There was a proposal to raise the water higher by hydraulic means. The pumping-engines are now working twenty-two hours out of the twenty-four at our present works. That is considered hardly safe. Every day, I understand, the water is completely run out, but the precise state of the reservoir will be spoken to by other witnesses. The water was filtered when it was first taken. Mr. Simpson

was applied to in 1855, to consider the whole subject of water, and to advise. He did so. He pointed out two sources on the river Dee. His report was printed and circulated among the public. I brought it before the citizens when I became Lord Provost in 1860. A joint committee of seventeen members was appointed to consider it, and that committee consisted of persons of property in the city. They considered all the schemes which had been suggested, and they invited all parties to make suggestions. The joint committee published a report in 1861. [The report handed in.] Their report was adopted unanimously. They recommended Mr. Simpson's scheme. Their report was submitted to the town council and commissioners of police, and printed for the information of the public. It was approved by the town council and police commissioners, and a committee was appointed to propose and carry forward the present bill, which bill is promoted now by the town council and commissioners. Reports have from time to time been made upon it, and these reports were in every case unanimous. A public meeting of the citizens was called upon the subject. That was in October 1861. It was held to consider the whole question of the objects of the present bill. Certain resolutions were then passed, and I have got a copy of them here. [Resolutions read.] I understood at an early period, that Sir James Burnett was opposed to the scheme. I waited upon him in consequence. He objected to a tunnel passing near his house. A covered aqueduct was proposed instead; but, on his making an objection, we proposed to carry it through by means of a tunnel, and gave instructions to the engineer to that effect. A letter from Sir James was then written, by which I understood him to say that he would not offer us any factious opposition. I believe the people of Aberdeen are unanimously in favour of the present bill.

Cross-examined by Mr. FORSYTH: The actual increase of the population in the boundary comprised within the limits of the present bill was about 18,000 between 1831 and 1861. That is an increase of less than 1000 a year. At the present time, our supply of water gives 16 or 17 gallons per head. If this bill passes, and we get 6 million gallons, we cannot have 81 gallons each, but something like 60 gallons. I cannot mention any towns that have such a supply, but I believe Glasgow gives 50 gallons a head. The average supply throughout the kingdom may be probably about 25 gallons. At all events, this bill would provide an excess beyond what is provided for other towns. We not only propose to supply Aberdeen, but persons having lands or buildings beyond the limits of the borough. In fact, we mean to become the purveyors of water to persons living beyond the municipal borough, and expect to derive an income from doing so. I do not know that that additional income would amount to £10,000.

The CHAIRMAN: Do you propose to go beyond the parliamentary boundary?

Witness: No, we do not; but provisions are in the bill to enable us to supply parties even beyond that boundary.

Cross-examination continued: We may sell, no doubt, to other parties; but we do not expect much revenue from going beyond the boundary.

Mr. FORSYTH: I find that, in 1831, the population consumed 165,000 gallons, and that, in thirty years, the demand was seven or eight fold more. How many years would elapse, according to the present ratio of increase of population, before that quantity of 6 million gallons per day will be used?

Witness: I think we shall require the one-half of it within ten years. I remember a meeting of the commissioners last August, at which I said I would venture to express my conviction that our water revenue would be increased in ten years to £10,000 a year. At present, our revenue from water is £6000 a year, and we expect to have it increased to £10,000 in ten years. I have no fishing on the river. The corporation possess fishing—not in the estuary, but in a small bay south of the Dee. If the fish did not go up to spawn, of course the whole of the fish in the river would be destroyed.

Cross-examined by Mr. MUNDELL (who appeared on behalf of Sir James Burnett): Had we adopted the Potarch scheme, instead of the Cairnton, we should have avoided Sir James's place altogether. One million of our 6 million gallons will be returned by means of hydraulic pressure. The estimate for the Potarch scheme was £112,000. The estimate for Cairnton is £110,000. This £110,000 does not include the proposed new tunnel at the back of Sir James Burnett's house. The increased works there are likely to be about £8000. The letter I spoke of was written by Sir James Burnett to his agent, and I asked him for a copy of it, which he gave. I understood Sir James certainly to say that he would offer us no factious opposition.

Re-examined by Serjeant BELLASIS: The provisions of our bill are intended to provide, not only for the present, but for the future wants of the city of Aberdeen, and its trade and commerce, also. If there is difficulty now in obtaining water, no doubt every ten years hence that difficulty would become still greater, if we do not now increase our supply.

The CHAIRMAN: I think you may dismiss this part of the case, and apply yourself to the point whether you can carry out this scheme without injuring the river?

Serjeant BELLASIS: I am obliged to your lordship for the suggestion, but one of the allegations in the petitions is, that the proposed supply is wholly unnecessary.

Witness, to Sir P. EGERTON: We contemplate giving a supply to the vessels in the harbour, and part of our supply will be used for driving some small machinery.

David M'Hardy, Esq., examined by Mr. LOCH.

I am a magistrate, and have been for six years and a half, and for nine years I have been a member of the town council of Aberdeen. I agree with the first witness as to the insufficiency of the present supply, and the necessity of raising water to the higher parts of the town. Our present machinery was improved, for the purpose of forcing the water higher; and we have decided that our only means of supplying all parties is by gravitation. The sewers of Aberdeen are not supplied with water at present. We want water to flush them; our drainage also requires water; and so do our sanitary improvements. There are 29 miles of streets in Aberdeen, and 8 of these only are supplied with sewers. I think the scheme suggested by Mr. Simpson will effectually remedy the evil. I have considered all the other schemes, and, after due deliberation, have decided in favour of the Cairnton scheme. I am not a fisherman.

Cross-examined by Mr. FORSYTH: The last two years were very wet ones in Scotland. The river Dee has been unusually swollen this year, and so it was last year. I have seen the Dee in its swollen state. It has a much wider channel in some parts than in others. In all shallows there are rapids. I am not so well acquainted with Cairnton as I am with the Bridge of Dee, but between these two places there are shallows.

Dr. *Jackson,* examined by Serjeant BELLASIS.

I was the convener of the sanitary committee and the committee for the removal of nuisances, and have had my attention called to the sanitary condition of Aberdeen, the state of its drainage, and the supply of its water. For a city like Aberdeen, its defectiveness in these respects could hardly be exceeded. There are whole streets without any sort of accommodation in the shape of necessaries, and to that I attribute the prevalence of fever in these districts. In some places, the fever is 18 per cent.; in others, 9. The class of people who were visited by this fever derived their supply of water from wells. There are 91 wells in the town; 200 or 300 families are supplied from one well. There are not any underground sewers in the districts I am now speaking of. The same districts abound in cesspools and open ashpits, which are frequently uncovered, and the smell from them is extremely offensive. The liquid from them passes into the streets. I consider that a complete system of sewerage is required for Aberdeen. Any system would be injurious if it carried the offensive matter into the sewer, and did not carry it out again. That matter would, in fact, be more dangerous in the sewer than if it were lying exposed upon the ground outside. Many of the house-drains come into the open streets. There are a considerable number of slaughter-houses in Aberdeen; 700 head of cattle a week are killed there. The animal matter passes into the street channel. We have tanners following their trades in the town, and their places are very open. The wells are frequently dry for hours in the day. The houses in the higher parts of the town are likewise deficient in the supply of water. They force the water up to reach them. I am not aware that there is any disposition on the part of the lower classes to avail themselves of baths in their own houses; but they are greatly improving in their habits, and the more access they have to water, the greater desire there is among them for its use.

Cross-examined by Mr. FORSYTH: I have observed the general supply of water in other towns. I believe that 45 gallons per head is considered barely sufficient in Glasgow. I do not know that the calculation of the average is 36 gallons a head. It is 52 gallons in Greenock. [Witness here read from a work written by Dr. Strang, to show that the absolute uantity in Glasgow was 46 gallons a head.]

Mr. *William Duncan,* examined by Mr. LOCH.

I am the treasurer of the police, and was previously a commissioner of police. I was commissioner nineteen years. I recollect the passing of the Act of 1829. Previous to that, the supply of water in Aberdeen was very trifling. It was under 200,000 gallons a day. In the dry year of 1826, it was down as low as 35,000. The salmon proprietors gave a very strong opposition to our original scheme, but they were satisfied on finding that we would not take more than half an inch from the surface of the river. The pipes were 15 inches in diameter. All opposition then ceased, and the bill was passed accordingly. In 1831, during seven months of the year, 132,480 gallons were supplied, the engines working five hours; in 1832, 165,600 gallons in six hours fifteen minutes; in 1833, 198,700 gallons in seven hours thirty minutes. Between 1833 and 1843, we increased the power of our engines; and, in 1843, we supplied 468,000 gallons in seventeen hours forty minutes; in 1844, 589,000 gallons in fourteen hours fifteen minutes; in 1850, 807,300 gallons in nineteen hours thirty minutes; in 1851, 891,480 gallons in seventeen hours; in 1856, 1,057,500 in twenty hours ten minutes; and, in 1861, 1,158,920 gallons in twenty-two hours six minutes. We had to work Saturdays and Sundays, and on the whole seven days in the week—that is, working up to our full power. We kept a register of the work in the reservoir, and that was noted four times a day. It shows how the water flows from the reservoir. Every precaution is taken to prevent waste of water. The reservoir is shown by the register to be entirely empty at times. Therefore, when the cistern was for all practical purposes empty, had a fire occurred there would have been no water at the command of the authorities to extinguish it. At some time, during several days, the reservoir is empty, and we have frequent complaints in consequence.

The CHAIRMAN: The committee are quite satisfied that the supply is insufficient.

Examination continued: The insufficiency falls principally upon the poorer classes. There are from 60,000 to 62,000 inhabitants within the police boundary. Looking at the future probable increase of the city, and judging by the increase of the past, I think we are not asking for more water than we shall require by our new plan a few years hence. It will improve the habits of the poorer classes when they use more water. They will then become more cleanly and more healthy.

Cross-examined by Mr. FORSYTH: The borough has been increasing at a lesser rate than 1000 a year. If it goes on in the same ratio, the population will be 100,000 in some years hence, and 3 million gallons a day would give that number 30 gallons a head. I am aware that the salmon fishers entertain serious fears that the bill will interfere with their fisheries. The bill does not provide any means of compensating them for the quantity of water we propose to take; and it is, no doubt, true that, by our former bill, we agreed not to take more than half an inch below the surface, lest they should be injured.

Re-examined by Mr. LOCH: I heard Mr. Hope Scott make his speech today. I am aware that the present bill incorporates the Water-Works Clauses Act, which provides compensation for parties injured. That was an Act not passed in 1829; it was passed much more recently.

Mr. *James Matthews,* an architect from Aberdeen, was examined by Serjeant BELLASIS, and pointed out upon the map the new and old parts of the town.

THURSDAY, MARCH 20.

The CHAIRMAN announced that the committee were of opinion that so much of the preamble as related to the necessity for an additional supply of water might be taken to be proved, and desired the counsel to direct their attention to the locality whence the water was to be obtained, and how it was to be conveyed to the city.

Mr. *Anderson,* examined by Serjeant BELLASIS.

I have been in the employment of Mr. Simpson, the engineer, for sixteen years, and I assisted him in making the necessary survey for these works. I went to Aberdeen in 1855 and 1860, to survey the district. I took gauges of the river at Woodend, about a mile above Cairnton, and at Inchmarlo. I made transverse sections of the river in many places, in order to ascertain the quantity of water in it, and its velocity, so as to form an opinion respecting the quantity that flowed past any given point daily. I was assisted by several intelligent men, who had resided on the spot for many years, and who had had many opportunities of examining the state of the river at various times. I have worked out a table, showing the quantity of water. Opposite each depth, I have marked the quantity and velocity of the water. Joseph Milton was gardener to Mr. Forbes, and had seen the river every day for thirty years. He took me out to a submerged rock in the middle of the stream, and said that he had twice, in twenty years, seen the water as low as the surface of that rock. My gauge stood six inches above zero at that spot. The rock at that time was 10¾ inches below the surface of the water. That was in August, 1861. I measured it again in March, 1862, and obtained the same results. It confirmed me in my supposition, that

the water usually stood about five inches below the zero in my scale. I calculated from this, that 170 million gallons a day was the smallest quantity ever in the river. Mr. Despard was also employed to make similar observations. We checked each other's calculations. At Inchmarlo, the water stood at eight inches below my zero. I calculated there would be 183¼ million gallons a day. At Cairnton, in ordinary times, abstracting 6 million gallons a day would lower the level one-fourth of an inch; but, in cases of extreme drought, half an inch would be sliced off. The extraordinary droughts only last from a week to ten days. I have heard it said that there is sometimes only 45 million gallons in the stream a day. In order to get so low a discharge, the river must descend 16 inches lower than it has ever been known to do during the last twenty years. The depression of half an inch at Cairnton would not cause a greater depression below the Bridge of the Dee than one-eighth of an inch. There are a great many springs in the neighbourhood, showing that the ground is retentive of water. The snow lies on the mountains sometimes till Midsummer. I should, as an engineer, rely strongly upon the fact that the rock rarely appeared above the water. Mr. Walker, the solicitor to the bill; Mr. Simpson, the engineer, and myself, called upon Sir James Burnett, to see about laying down the culvert in front of his mansion. Sir James objected to its going through his plantation, as it would spoil his trees. He asked why we did not take it behind his house? Mr. Simpson, as an engineer, objected to doing so. Hearing Sir James was displeased, we waited upon him again. He still expressed a wish to have the culvert taken behind his house; and said, if that were not done, he should oppose the bill in Parliament.

By the COMMITTEE: The culvert is three feet in diameter. Compensation would be awarded, under the Water-Works Clauses Act, for any injury he might sustain.

By Serjeant BELLASIS: I prepared new plans for taking the tunnel behind his house, in accordance with his request. Samples of water were taken from Cairnton, and half a mile lower down.

By Mr. FORSYTH: The volume of water is much greater at the Bridge of Dee than at Cairnton. The river, above the Bridge of Dee, varies greatly in depth and width. I have not seen the water rippling over the gravel less than a foot or eighteen inches in depth. I have never seen the Dee in a very dry summer, such as in 1829. The last two years have been unusually wet. I am not an Aberdeenshire man, neither am I a fisherman. I first saw the Dee in 1855. The bed of the river at Cairnton, is composed of large boulders and coarse gravel. I found the water round a rock within two yards of the shore was three feet deep. The water in the middle of the river was very deep. I think the great bulk of the river was over three feet deep. Between Potarch and Cairnton, a considerable stream called "Cattie Burn," flows into the river. I tried the depth of water during six months. I tried five or six velocities. In frosty weather, the river falls as low as in hot dry weather. The extent of the drainage area of the Dee, above Cairnton, as taken from the best maps, is 525 square miles, or 366,000 acres. I calculated the depth of rain, in the course of the year in that district, taking the average of five years, to be 34 inches. The amount of evaporation is affected by various causes. About one-fourth of the rainfall is lost by evaporation. The district is porous, so the water would sink into the land, instead of running off. There is very little cultivated land in the district. Where drainage is carried out, the floods pass away more rapidly than they would otherwise do. I do not know that the floods of the Dee pass away more rapidly than they did formerly.

By Mr. MUNDELL: I do not know whether Sir James Burnett had any notice of our intention to visit his estate for the purpose of these works. There are some fine old trees in front of the house. We proposed to go through the plantation for about a mile. Sir James complained that he had not been consulted upon the subject. He spoke of some other line by which we could avoid his property altogether. The difference in cost between going at the back instead of the front of his house would be £4000 or £5000. There is another way by which we might take the water from Potarch.

Serjeant BELLASIS: There is nothing in the petition about our taking the water from Potarch.

Mr. MUNDELL: They can take the water from another place higher up, without injuring Sir James's property.

Serjeant BELLASIS: The matter not being stated in the petition, my learned friend cannot go into a fresh scheme.

The CHAIRMAN: I am clearly of opinion that no fresh scheme can be suggested by Mr. Mundell not mentioned in Sir James's petition. He had better cross-examine as to the injury which will be sustained by Sir James by the proposed tunnel at the back of his house, of which, as yet, we have had no evidence.

By Serjeant BELLASIS: There is always a ripple at the edge of the shore, but there was always a deep channel along the whole course of the river, so far as I saw. The lowest average amount of the rainfall which would go to the river would be one-fourth.

By the COMMITTEE: We did not ask Sir James's permission before we commenced our survey. He caught us trespassing.

The CHAIRMAN: That is not a very conciliatory mode of proceeding when you are going within 300 yards of a gentleman's drawing-room window.

Witness: There was some mistake about it. A letter asking his permission was written, but not sent.

Mr. *Richard Carden Despard*, examined by Serjeant BELLASIS.

I am a civil engineer. I was requested by Mr. Simpson to undertake the gaugings of the river Dee. I went there in January last. I commenced operations on the 13th of January, and from that day to the 14th of February I was actively employed in the survey. I examined the flow of the river and its bed. I have measured most of the gaugings in the map. In the beginning of this month there was a hard frost in the highlands, and the water was then five inches on the gauges. I set up from gauges—one, 5 miles below Cairnton; the next 10½; the third, 14 miles below Cairnton; and the fourth, a quarter of a mile above the Bridge of Dee. I carried out an independent investigation, and compared the results with those obtained by Mr. Anderson. The minimum quantity of rainfall at Woodend I calculated to be 17 inches in the year. I calculated that two-thirds of the rainfall would flow into the river. I took the most reliable observations as to the rainfall in five places in the district that I could obtain, and I also took the average of five years. The other stone at Woodend was pointed out to me by Colonel Ramsay, and those in his service, as being the mark of the lowest depression of the river during twenty-five years. We then examined the rest of the river. The lowest level of the river at Inchmarlo would appear to have been eight inches below the zero of the gauge. The volume passing at that minimum level would be 183½ million gallons daily. At Inchmarlo, there would be 334,200 gallons daily per square mile, and at Woodend it would be 327,000 gallons per square mile per day. At Banchory, the lowest level would be about 10¼ inches below zero. About 217 million gallons per day would flow past there. At Park, there is a stone called the "Keith Stone." I was informed that the water was never known to be more than six or seven inches below the surface of that stone. I, however, found that it must fall 13 inches below. That would give 229 million gallons, or 339,000 gallons per square mile a day. At Culter, there is another stone called "Thorney Back," and the lowest level was 7½ inches below that, giving 249 million gallons a day, or 332,000 a day per square mile. Alexander M'Donald, the lessee of the fishing at Aberdeen, confirmed my theory by his practical knowledge. I examined the whole of the river, gauging the pools and the rapids. In March, the level was 3 inches above zero, but the average we took was 3 inches below zero. We always calculated upon the lowest quantity of water when the level was reduced by extraordinary droughts. The smallest depth, in extreme droughts, on any part of the river is over a shoal called "Manse Earth," where, on such occasions, it would be only 9 inches deep. The depression caused by abstracting 6 million gallons per day, would be three-tenths of an inch. That is the shallowest shoal. The next shoal is 10 inches at the minimum level, where the depression would be only a fourth of an inch. These depressions, in a stream of this kind, are only appreciable by calculation. It would be impossible to appreciate them otherwise. The depression would be much less below the Bridge of Dee. The 6 million gallons or twenty-eighth part of the minimum quantity of water at Woodend, and only a forty-third part of the minimum at Aberdeen. That drought would only occur once in seven years. Six out of the seven years there would be 266 million gallons a day at Woodend. The depression from abstracting the 6 million gallons would not amount to more than one-eighth of an inch at Aberdeen. They could not float timber whilst I was there. It is impossible there can ever be less than 170 million gallons a day at Woodend.

By Mr. CALVERT: I based my calculations upon information I received from the people I told you of; and they are here to tell you for themselves what they know.

John Mennie, examined by Mr. LOCH.

I am a sheriff's officer, and have been so for seven years. Between 1841 and 1851, I was a floater of timber. I live at Banchory. I used to float timber from three miles above Cairnton. I have had a good opportunity to become acquainted with the state of the river. We used to float the timber mostly in the winter. We had need to watch certain stones, which showed us when the water was deep enough for our purpose. From 1855 to 1860, I was water-bailiff on the river. It was my duty to see that no person fished during the close fishing. The river is lowest in May, June, and July; but that depends greatly on the amount of snow on the mountains. After a heavy winter, when there has been a great deal of snow, the river keeps up until June. The river often rises without there being rain, when there has been a west wind, which brings rain upon the mountains. The largest droughts occur in September. I gauged the river in September at Inchmarlo, Banchory, and Cairnton. I was employed by Mr. Despard. I pointed out to him the lowest level I had observed from Cairnton to Aberdeen. The river was very low at the time. A few days after, we sailed down the river. We took eight days to do twenty miles. We took the velocities of the river; and Mr. Despard took sections of the stream. I then pointed out to him all the well-known stones and shallows. I know several spawning-beds in the river. I have seen salmon spawning in all those places. The small fish go up the highest, and then also up the small rivers. The depth of water upon the spawning-beds varies from two feet to eighteen inches. I have never known the fish unable to come up for want of water. There is not so much wood floated down the Dee now as there formerly was. That is partly owing to the wood being consumed, and partly to the railway conveying it.

By Mr. FORSYTH: I have known the river very low in October. It was my principal object to find out when there was sufficient depth to float the timber. The water may have fallen much lower than would be sufficient to float timber, without my having paid much attention to it. The greater number of the fish go above Cairnton to spawn. I have never seen the river in such a state that the fish were compelled to turn back.

By Mr. LOCH: There were certain stones below which I have never known the water to fall; and these were what I pointed out to Mr. Despard.

Joseph Milton, examined by Serjeant BELLASIS.

I am the gardener at Woodend to Mr. Mansfield Forbes, one of the petitioners against the bill. I have been there about twenty years. Woodend is about two and a half miles above Cairnton. I have been in the habit of fishing in the Dee at Cairnton. The fish come up in the greatest numbers in the spring, when the river is at a medium level. They never come up when the river is low, as the stake and bag-nets at the mouth take very good care they shall not. The lowest level at which I ever saw the river was in 1859. The fish could always get up, so far as depth of water was concerned. I never saw a salmon coming over a shallow. There is a stone near Woodend Cottage that I have observed for twenty years. I pointed it out to Mr. Anderson, as having seen it above the water twice in twenty years.

By Mr. CALVERT: I do not know much of the river below Banchory. Banchory is five miles below Woodend. I never saw one inch of the stone dry. I took notice of the stone, because my boat has struck upon it sometimes.

James Simpson, Esq., examined by Mr. LOCH.

I am a civil engineer, and was called upon by the authorities of Aberdeen to survey the district in 1855. I suggested a scheme as to the best mode of supplying Aberdeen with water. There were two gravitation schemes, and some pumping schemes. The water was proposed to be obtained from the Don or the Dee. The thing went to sleep until 1860, when I was again spoken to on the subject, and I again surveyed the district. I suggested the two schemes of taking the water either from Potarch or Cairnton. I thought the Cairnton scheme best, and told them so. In order to accommodate Sir James Burnett, we carried the tunnel behind his house, at an additional cost of £4000 or £5000. In taking the line through the hills, I believe we are meeting Sir James Burnett's objections. I said, at the time, we ought to do everything to conciliate him, as we were going through so much of his property. I was happy to find that the authorities of Aberdeen fell into my views on that point. The estimate I proposed was as follows:—

Lower Service.

Brick aqueduct	£41,250
Tunnels at Cairnton and Crathes	8,750
Wrought-iron aqueduct	4,400
River tank and other works	700
Man-holes, overflow-tanks, &c.	1,550
Culverts and aqueducts	750
Reservoirs at Invercairnie	11,500
Reservoirs and filters at Springbank	6,500
Main-pipe from reservoir at Waterhouse, Union Place	5,100
Sundry works	500
	£81,000

Upper Service.	
Hydraulic engine-house, &c.	£2,100
15-inch supply and eduction-pipe	750
9-inch pumping-main	1,470
Reservoir and filter at Hillhead	1,865
Distributary-main for reservoir	2,250
	£8,435
Land and compensation	£10,565
Contingencies, 10 per cent.	10 000
Available surplus	5,000
Amount of parliamentary estimate deposited Dec. 31, 1861	£115,000

Every part of Aberdeen will be reached by the water from that aqueduct. We cross the burns on piers. We preserve the level as far as possible. We propose to take 6 million of gallons from Cairnton. We supply 5 millions to the inhabitants of Aberdeen, and return the other million to the Dee. We do not propose to take that quantity at first. We shall supply the ships with water, and also furnish it to water the roads. Most towns are beginning to use much more water than they did formerly. I think the immediate wants of Aberdeen would consume 2½ million gallons a day, and, if the sewers were flushed out as they ought to be, it would take 500,000 gallons a day more. Aberdeen is very badly supplied with water at present. I went to Cairnton for water because it was above all the polluted burns. Some of them are no better than common sewers. When we had got to Cairnton, I found we had reached a sufficient level to supply the water without pumping. We are to have small hydraulic works. Pumping water to supply Aberdeen would be very expensive. The Dee at Cairnton is 230 feet above the level of the sea. The Dee passes through large quantities of drip gravel. The character of the soil is such as to retain the water, and to give it off slowly. I do not think the floods come on suddenly, and cease soon. Assuming 6 million gallons to be taken from the river, I agree with Mr. Anderson that the depression would be half an inch in the rapids, and an inch in the pools.

Cross-examined by Mr. CALVERT: I obtained Mr. Anderson's returns. In October last, the owners of the fisheries applied to me. I have never known a case where there has been no compensation in either money or water when water has been abstracted from a river. This is an exceptional case, as there are no millowners injured. It would cost £5000 to make a compensation-reservoir. The water in the lochs is very good. I distrust reservoirs altogether, because, when you let off the water, you kill all the fish for miles. The water smells, when kept in a loch or reservoir for long periods, in hot weather.

Serjeant BELLASIS objected to the tendency of these questions, as it was clear his learned friend wished to found upon them a proposal that compensation should be made out of Loch Calleter. That was not mentioned in the petition, and he objected to having it thrown upon him.

Mr. CALVERT said, he had never mentioned Loch Calleter as the place from which the compensation water was to be derived. He merely wished to show that there was a natural supply of water from whence the compensation water could be obtained.

The CHAIRMAN said that, as the compensation-reservoir was mentioned in the petition, he should not stop the examination.

Cross-examination continued: There were many objections to a compensation-reservoir. It would be thirty miles away, for instance. I did not think I was justified in spending the money of the ratepayers of Aberdeen on a scheme that might turn out a failure. The moss would make the Calleter water so bad that it would pollute the stream. It was not so much the mechanical difficulties that deterred us as the danger of deteriorating the stream. I looked at it as a theory rather hastily arrived at. I do not think 2½ million gallons a day are too much for the 75,000 inhabitants of the borough, taking into consideration the probable increase. I allowed 25 gallons per diem a head. I do not know any other town where 75,000 inhabitants have 5 million gallons a day, but I know many towns that have quite as much comparatively. I know, if I took less, I should not have sufficient. I do not think that the new railways will take away the traffic from Aberdeen. I propose to make the culverts three feet wide, with a fall of two feet in the mile. The reservoir would contain 80 million gallons. The service-reservoirs at Aberdeen would only contain about a clear day's supply.

FRIDAY, MARCH 21.

The CHAIRMAN said, it would shorten the proceedings very materially if Mr. Calvert would endeavour to show the extent of the damage which would be done the fisheries by the abstraction of the 6 million gallons from the river.

Mr. *Simpson's* cross-examination resumed by Mr. CALVERT.

I think the water from the compensation-reservoir would be foul. Mr. Leslie made certain calculations touching the estimates. In doing so, he allowed for contingencies, but he copied greatly from my calculations.

The CHAIRMAN: Supposing under the original Act the half inch had even been abstracted below the Bridge of Dee, what effect would that have had at Cairnton?

Witness: Engineers practically acquainted with hydraulics may have reported that they believed there would be a depression at Cairnton, but all their notions must consist of so many approximations to the truth.

The CHAIRMAN: You believe it would be infinitesimally small?

Witness: So small that it would be imperceptible.

Re-examined: All our calculations go to show that a quarter of an inch would be the utmost we could depress the surface at Cairnton by the abstraction of the 6 millions. I do not think 6 million gallons excessive for Aberdeen, looking at the prospective increase of the town. At Newcastle-on-Tyne, it is proposed to give 58 gallons per head, with a power to increase that supply. The ultimate provision would be upwards of 80 gallons a head for Glasgow. I have never known compensation in water given for fisheries, nor do I know any case where that compensation was even asked for until now.

Serjeant BELLASIS: I am happy to inform the committee that Sir James Burnett has withdrawn his opposition, he being quite satisfied with an assurance that we shall take our line in a manner agreeable to his wishes past his house.

Thomas Hawksley, Esq., examined by Serjeant BELLASIS.

I am a civil engineer, have devoted my attention particularly to hydraulic matters for more than thirty years, and have constructed water-works in many parts of England. I visited Aberdeen with the view of making myself acquainted with the river Dee. I know that river, and most of its tributaries, for a distance of sixty miles. Those tributaries are numerous and various in their nature. The present population of Aberdeen is about 75,000. It is in general necessary to provide for a duplicate population in any large town. In a case of this kind, it certainly is necessary to provide for a much larger population than Aberdeen possesses, and, therefore, a scheme to give 6 million gallons is not excessive. The works are intended to be on a very permanent scale, and it would be imprudent on the part of the promoters to apply for powers to supply a lesser quantity. The quantity given by Parliament is 40 or 50 gallons per head, and, in some cases, a much larger amount. A very much larger quantity of water is used now than formerly, and in Scotland more is used than in England, in consequence of the houses being laid out in flats. Taking into account what is immediately wanted in Aberdeen, and what is likely to be wanted in a few years, I think 6 million gallons as a maximum may be taken, of which 1 million will be returned to the Dee. That quantity will not be taken unless it is immediately wanted. If the population of Aberdeen does not increase, then the 6 million gallons will not be taken. The water will be filtered. That is an expensive process, which imposes a limit upon waste. In a case like this, gravitation works are decidedly preferable to pumping.

The CHAIRMAN: We may as well stop this examination at once, by stating that, in the opinion of the committee, the preamble is proved. As Sir James Burnett has withdrawn his opposition, the only question which now remains is this—Will there be any damage done to the river? and, if so, what means of compensation are proposed?

Mr. FORSYTH: I must say, that this sudden conclusion on the part of the committee has taken me very much by surprise.

The CHAIRMAN: I repeat, that the committee are of opinion that the preamble has been proved; that a greater supply of water is necessary for Aberdeen; and that that supply should be taken from Cairnton.

Mr. FORSYTH: We do not mean to deny that Aberdeen requires a larger supply; but, then, we say that the taking of 6 million gallons at this particular spot will be injurious to the fisheries.

The CHAIRMAN: You can raise the whole question of compensation just as well upon the clauses as you can upon the preamble. We shall now postpone all the clauses up to 386, and commence at once with the water clauses, the first of which is 387.

Clause 387 was agreed to.

On clause 388 being read,

Serjeant BELLASIS said, that upon this clause he was prepared to prove that the quantity of water the promoters proposed to take at Cairnton would do no injury to the fisheries.

Mr. *Hawksley's* examination continued: I think the river will not be injured by the abstraction of 6 million gallons at Cairnton; and that, in the pool, the loss of water will be something under three-eighths of an inch. In a rapid, there might be a loss amounting to about one-eighth of an inch. There is a wonderful increase of velocity in the case of a shoal. Assuming that the dimensions of the river should be down to 50 million gallons per day, and that 6 millions were abstracted, the surface would be reduced five-eighths of an inch in some places, and three-tenths of an inch in others. Assuming 170 million gallons to be the true minimum quantity of the Dee, no sensible injury would be done the river by the abstraction of the 6 million gallons. Of course, a theoretical one would, but it would be almost inappreciable. Having ascertained the amount o [illegible] the minimum flow of water, then I say that a compensation-reservoir ought not to be given for the fisheries. Compensation-reservoirs are only given in cases of mills; and on this river, which is 80 miles in length, there is not one single mill. If compensation-reservoirs were to be given, then the rights of all the parties residing along the stream would be interfered with. All the noblemen and gentlemen living along the river would then have a claim for damage; and, among others, the representatives of the late Prince Consort, who had a frontage to the river of about ten miles. I inspected the various lakes. There is no vegetation in some of those lakes. If any real injury is done, either to the landowners or the fisheries, their claim for compensation is fully met by the 6th section of the Water-Works Clauses Act. That section amply provides for any damage whatever which any man on the river may suffer; and, under it, he has the power in his own hands of raising the arbitration himself.

By Sir P. EGERTON: I know of no case in which salmon fishers were ever compensated by means of reservoirs.

Cross-examined by Mr. FORSYTH: I am not a lawyer, but still I take upon myself to say that ample compensation to meet your case is given under the Water-Works Clauses Act. I was only once at the river Dee this year, and never saw it in a dry season. I should think there are no rapids in the lowest parts of the Dee, which are as low as 8 inches. The gauges were kept daily for several years.

Mr. *William Joshua Fennell*, examined by Mr. LOCH.

I was until recently inspector of fisheries for Ireland, and am now inspector of fisheries for England. I have heard from the scientific witnesses, that the abstraction of 6 million gallons from the Dee will reduce the depth of the river to the extent of from half to five-eighths of an inch, but I consider that that will not in any way injure the fisheries. It will not injure the spawning. The principal spawning-ground is higher up the river than where the water will be taken from. Fish will spawn in very shallow water indeed. In the lower part of the river, the water is almost too deep for the spawning, and therefore the works will improve that part of the river for that purpose. I do not think a slight reduction of the depth will interfere with the passage of the salmon up the river. I know that in large rivers salmon will not go far up, but that is not in consequence of shallowness, but from atmospheric influences and the quality of the water. The catch of fish about the mouth of a river is much increased in hot weather. There is, in consequence, no danger to the fisheries to be apprehended, nor is there anything that should make us hesitate in the carrying out of the scheme. To bottle up water in reservoirs for the purpose of letting it out in dry weather is worse than useless. The fact of water being bottled up in that way will not induce the fish to go up a river unless they are impelled by instinct. The depth of the water does not regulate their progress up in dry weather, but the freshness of the water does.

Cross-examined by Mr. FORSYTH: I told the promoters that they were running a risk in sending me to Aberdeen to inspect the river; because, if they were going to damage the fisheries, I should damage them as much as possible. A very large salmon will, under certain circumstances, pass in six inches of water. Fish will commence going up as early as January, but their principal time is in the spring. They will not go up in dry weather. Temperature affects their passage up. If the depth be reduced, the temperature will be increased in the warm weather, and that would check the ascent of the fish. If an average-sized salmon is on the run, it might force itself up in three or four inches of water.

By the COMMITTEE: The abstraction of water, the storing it, and then the letting of it out, would injure the river, but if you were to cause it to flow out more gradually it would not have time to deteriorate.

By Mr. LOCH: To abstract water for the purpose of storing it to such an extent as to diminish the flow of the river would, of course, do damage, but

I should think that course would never be taken except under the authority of a special Act of Parliament.

Mr. KINGLOCK stated that he was a resident at Park on the Dee, that he had been the owner of land there for the last twenty-three years, and that he was a salmon angler, and knew the whole of the river. In general, it was a very high river. He had seen a large salmon go up the river Nairne with two-thirds of its body out of water. He heard Mr. Fennell's evidence, and agreed with him that salmon will not go up a river in hot weather. He had never seen the Dee so shallow as to prevent floats from coming down, but much depended on the size of the timber.

Mr. YOUNG, who had been forty-three years engaged in salmon fisheries, stated that from 1843 to 1853 he had managed fisheries for the Duke of Sutherland. He had made the study of salmon his pursuit for many years, and had repeatedly seen the Dee. He believed, from his experience, that if the quantity of water taken for the purpose of supplying Aberdeen were to reduce the surface of the river by one inch, it would not have the effect of injuring the fisheries. An additional inch of water in summer would not induce the fish to go up.

Mr. JOHNSTON MONTROSE said the value of the Dee fisheries above the tideway did not exceed £300 a year. Fish generally spawned in shallow water—in water of six inches in depth, rather than in deep water. He was a large lessee of fisheries himself, and paid £4700 a year for them. He would give just as much money for the fisheries on the Dee as he would at present, if all the water now proposed were abstracted from it for the supply of Aberdeen.

Mr. *Peter Brown*, another lessee of fisheries, was called to prove that, in the months of June, July, and August, salmon had not a disposition to ascend a river.

Mr. *Robert Brown*, a wood-merchant, living at Banchory, said that, in 1860, he purchased 45,000 standing trees, on the banks of the Dee, which he was bound to cut in seven years. About 40,000 still remained uncut. He had floated a large quantity of those which had been cut down the river: but the floating had diminished, partly on account of the establishment of sawmills near at hand, and partly because of the conveyance of timber by railway. He did not believe that the lowering of the river to the depth of an inch would affect him in the floating of his timber.

Mr. MACLAURIN, parliamentary agent, stated that the bill of 1829 was opposed by the Duke of Argyll, and others. The ground of opposition on the part of the proprietors of fisheries then was the abstraction of the water, and the damming up of the water from the lake. The fishers wanted floods. Otherwise, they said, the scour of the river would be destroyed.

Serjeant BELLASIS announced that this was the case on the part of the promoters. He had an array of other witnesses to prove that the timber could continue to float, and that no injury would be done to the fisheries, by reason of the abstraction of the 6 million gallons for Aberdeen; but he did not consider it necessary to call any of them.

MONDAY, MARCH 24.

Mr. FORSYTH said he would commence the case on the part of the opponents of the bill by calling witnesses.

J. F. Bateman, Esq., examined by Mr. FORSYTH.

I am an engineer, and have had a large and a long experience in the construction of water-works, in various parts of the kingdom. I constructed the Loch Katherine works, which supply Glasgow with water. Loch Katherine is 35 or 36 miles from Glasgow. I was applied to by the petitioners against this bill to inspect the river Dee, and ascertain the damage which would be done to the fisheries by the proposed abstraction of water for Aberdeen. I visited the Dee last August, and examined the place from which the water is proposed to be taken. I met Mr. Simpson on the ground at that time. Subsequently, I suggested to him the propriety of constructing a reservoir, for the purpose of compensating the fishowners. I had previously examined the river, and wrote Mr. Simpson a letter, at his own request, explanatory of my views. When I was at the Dee, the river was in tolerably full volume. Last August especially, was an excessively wet month in Scotland. It rained incessantly. The state of the river about that period would not give any information of a reliable nature, nor has there been any opportunity since that time of ascertaining facts. I gave instructions, after my departure, to have the volume of the river measured. I then ascertained that the collecting area of water was 6000 acres. That area gave a large supply, but it is not favourable to the maintenance of a large volume of water. The whole of the basin of the Dee consists of granite formation, and that is excessively impervious to water. The river Leith is better fitted than the Dee for giving a large volume of water. I could give you various calculations all showing that a dry-weather volume varies from one-fifth to one-half, generally about one-third or three-tenths, for every 1000 acres. If we take the river Leith in May, 1853, we find the quantity as nearly as possible 100 cubic feet of water per second. At that time, the quantity obtainable from the Dee was 54 million gallons per day. By referring to gradients, we find that for seventeen years out of nineteen years the water was more than that; still, it is fair to assume that that 54 millions would be reduced to 25 millions or 30 million gallons a day, in extreme dry weather. It seems that 6 million gallons cannot be taken from 30 millions, or even 50 millions, without producing an injurious effect upon the river. It has been said, in the course of the evidence, that the minimum volume of water at Cairnton is never less than 170 million gallons a day; but I do not believe that to be correct. It is absurd to suppose that such a quantity of water could always flow past Cairnton. There is not the slightest difficulty in making a compensation-reservoir for the fishowners. I have formed an estimate of what it would cost.

Serjeant BELLASIS objected to the estimate being given.

Mr. FORSYTH contended that he was entitled to put the estimate in evidence, particularly as he was about to show that the reservoir could be made at a very moderate cost. The petition prayed that no portion of the works should be commenced until the compensation-reservoir was made.

The room was cleared. On our readmission,

The CHAIRMAN said, the committee had decided that they would allow the opposition the advantage of showing the necessity for making the compensation-reservoir, but that they would not allow any particulars as to the scheme to be gone into.

Cross-examined by Serjeant BELLASIS: The reason I have for proposing to make a compensation-reservoir is, that as much water as possible may be returned to the river. The Dee will certainly not be dry, but a great quantity of water will be taken out of it. We proposed to take 50 million gallons out of the lakes for the supply of Glasgow. The river Leith is about 60 or 70 miles from the Dee at Cairnton, but their respective drainage-grounds are only about 40 miles from each other. There may be about 40 square miles of *débris*, which will, to a certain extent, retain water in the district of the Dee. It is composed of coarse sand and gravel. The mountains near the Dee are 3000 or 4000 feet high. I do not know that there would be a very large rainfall on the summits and sides of those mountains. The valley is very unfavourably situated for rainfall. The rainfall decreases as you approach the sea. I dare say a large quantity of snow falls upon the hills. It takes 8 inches of snow to make 1 inch of water. A snowfall would not be registered upon the rain-gauge to any great extent. I do not agree with Mr. Anderson's calculations. I have gone on the supposition that for £5000 or £6000 a reservoir could be made, and that that would not interfere with the cultivated land.

Re-examined by Mr. FORSYTH: If the river were uniform in its channel, you could calculate the amount of the velocity, but that is impossible when the bottom is full of rocks and rapids.

Mr. *Alexander Adams*, examined by Mr. FORSYTH.

I have been for the last thirty years acquainted with the river Dee, and am the manager of the Aberdeen Salmon Fishing Company. The volume of water in the Dee for the last few years has been decreasing in the summer season. Less volume comes down. The drainage has been improving on the banks of the Dee higher up, and that has had an effect in reducing the water in the collecting-area. The fish ascend when the day is dull. They do not ascend so quickly when the sun is brightly shining. I have frequently seen them come back and refuse to ascend because of the shallowness of the water in June, July, and August. I have always seen that, after a continuance of dry weather; 1859 was a very dry year, and a very bad fishing season. The river was then very low.

Cross-examined by Serjeant BELLASIS: My fisheries are in the tidal waters only. I can see that the fish in the Dee have diminished greatly of late years. The nets used in the river have, no doubt, been one cause of that diminution. I was examined before a committee of the House of Lords last year, and then said that the fixed nets had caused a diminution of the fish, and that, in fact, they were the main cause of it. I do not think I then mentioned that the diminution of the river was one cause of it. We work the fixed nets so as to catch every fish we can find. When the water is low, and the fish are going up, we put out the nets to catch the salmon. I have frequently seen them turn back at various times for want of water. At one place, there was not more than a foot of water. I am not aware that fish are prevented by other causes besides the want of water from going up. The temperature might, no doubt, have an effect in preventing them from going up. I think the size of the fish has diminished in the Dee. The depression of one inch of water would, of course, lessen the volume in the river. I never measured the quantity in the Dee.

Alexander Donald, the taxman of a fishery on the Dee, said he had seen the river very low indeed; so low, as to make it difficult for him to use his fishing shot. He had seen the salmon struggling to get up, and turned back for want of water. He had seen that in April, May, June, July, August, and October. Lately, the water ran off more rapidly than it did formerly. It did not retain the water so long in volume.

Robert Clark, *Richard Reath*, *John Christy*, and *Robert Rinton*, taxmen of fisheries on the Dee, also proved the extremely low state of that river at certain periods, and the turning back of the fish because of its shallowness.

Mr. *Reay*, a wood-merchant, who had been in the habit of floating timber down the Dee during the last two years, proved that the river was often too low for him to carry on his operations. This particularly happened in the summer season. The quantity of water he required to float his timber down to Aberdeen was 18 inches, and the loss of an inch would stop the float.

Mr. FORSYTH announced that this was the case for the opponents of the bill.

TUESDAY, MARCH 25.

Mr. CALVERT addressed the committee on behalf of the opponents. He said, this was not an opposition which had for its object the exaction of money, but it was set on foot by persons who believed that an injury would be done to their fish, and who alleged that the scheme ought not to be sanctioned, unless the water taken from them in one shape should be returned to them in another. They did not object to the people of Aberdeen having water, but they did not wish an excessive supply to be taken unless they were compensated. They sought to guard themselves against every evil and every danger by obtaining such a compensation as was very common in cases of this description. It appeared from the evidence that the proposed supply would be excessive. Three million gallons would give the population of Aberdeen 40 gallons a head; 6 millions would give them 80 gallons, and that even if the population should increase to 100,000 in number. This was no question of poverty, because the promoters expected to derive a large revenue by selling the waters of the Dee. They were not only going to get an income inside the city boundary, but outside also, and, therefore, they ought to grant fair and reasonable compensation to the fishowners. Let the committee compare the conduct of the promoters now with what it had been in 1829. The Dee was not more favourable now than it was then. Indeed, it was less favourable; and yet in 1829 a limit of half an inch was imposed upon them. If now they took the water from the Bridge of Dee, the evil produced at Cairnton would be imperceptible; but, by taking it at Cairnton, the evil produced would be very great. If injury to the fishes were apprehended in 1829, certainly greater injury to them might be expected now. The committee had heard from the witnesses yesterday—witnesses who lived upon the spot—that the Dee was too scant in its supply of water already to enable the salmon to reach the spawning-beds, especially in seasons of drought. His learned friends on the other side had undertaken to prove a negative by showing that no injury would be done the salmon fishers. Their first evidence consisted of mere observation. Mr. Despard and Mr. Anderson both said, speaking from observation, that no injury would be done. Several other witnesses had spoken of the river at its lowest volume, meaning thereby at the lowest they had ever witnessed; but, in no one instance, where their evidence had been tested, had it borne the examination. The fact was, that watching the rise and fall of rivers, where inches and half inches were concerned, required a peculiar turn of mind, combined with long and careful study; otherwise, it would be open to very grave objection. Now, the explanations given by Mr. Bateman were remarkable for their perspicuity: and, if the facts respecting which he gave evidence were to be relied upon, then the calculations on the other side were fallacious, and no confidence could be placed in them. Most of the witnesses called on behalf of the opponents were practical men, thoroughly acquainted with the Dee, and their evidence went to show that the salmon had repeatedly turned back in their ascent, because of the shallowness of the river. The evidence that the minimum volume was 172 million gallons, was founded in error, because the last two years, upon which the calculations were based, were altogether exceptional ones, being the wettest which had been known for a long time in Scotland. How were the committee to determine between the parties? Why, in this way: If they could find a district analogous to the Dee—of the same stratum; of a stratum, too, equally impervious to wet,

and on which the rainfall was similar; then they might be able to form a tolerably correct conclusion. This appeared to have been the course adopted by Mr. Bateman, with regard to the river Leith. Both the Leith and the Dee were very much alike, and so was the ground surrounding them. The rainfall, however, was widely different in both places. Any inference the committee might draw of the state of the Dee, as compared with the Leith, must be very much in favour of the Dee, because of the rainfall there being in excess; and yet the committee would be of opinion, from an analogy between those two rivers, that the minimum of 170 million gallons upon which the promoters relied, must be quite erroneous. In short, without going into any theory whatever, there was an end of this extraordinary minimum of 170 millions, because, according to Mr. Bateman's calculation, there were 54 millions only in the Dee, and that was liable to a reduction of one moiety, which would bring it down to 30 millions at Cairnton. To withdraw 6 millions from 30 millions, was surely a matter of serious consequence—quite sufficient to induce the committee to come to the conclusion that a reservoir for the fishowners was indispensably necessary. The truth was, the promoters had been misled by the information they had received, and they had encountered opposition because they had made no arrangements for providing a compensation-reservoir; but, doubtless, the committee would be satisfied that there had been an entire mistake, and they would deal with the question accordingly, ordering that the water abstracted should be returned, in order that the salmon might not be interrupted in their course by a minimum flow. But, then, it was said that a compensation-reservoir could not be given, and that it was quite unusual to give it. Mr. Bateman had shown, however, that it could and ought to be given; and, undoubtedly, it seemed but fair and reasonable that the fishers at Cairnton should be listened to when they were going to be deprived of 6 million gallons daily, and when they claimed compensation. He (the learned counsel) was anxious to get from Mr. Simpson his reason for not giving the reservoir, but Mr. Simpson's answer was like that given in the case of Dr. Fell:

> "I do not like thee, Dr. Fell—
> The reason why, I cannot tell;
> But this I know, and know full well—
> I do not like thee, Dr. Fell."

And so, Mr. Simpson did not like to give it, and that was the only reason he assigned. Then came Mr. Fennell, who talked about bottling up the loch; but Mr. Bateman, with his much greater experience, completely obviated Mr. Fennell's objection, by referring to the Glasgow works, and the compensation granted there to the owners of fisheries. Then, it was said that, if compensation were given at all, foul water must be given; but foul water coming from Scotch lochs seemed something incomprehensible to persons acquainted with their purity. Then, it was said there was no precedent for giving it; but, in the case of Glasgow, compensation for fisheries was actually given. Next, it had been suggested that compensation could be obtained under the Water-Works Clauses Act. He submitted that, however advantageous that Act might be in many respects, with reference to ordinary purposes, circumstances might arise in the present case which would render its benefits nugatory. But the fact, at all events, was undeniable, that the fisheries on the Dee ought undoubtedly to be protected. The promoters were the moving parties on the present occasion, not the opponents. If the promoters were wrong, then the fisheries would be utterly lost. If the opponents were wrong, then the promoters could only lose £5000 by making an unnecessary compensation-reservoir. Therefore, the balance of testimony was greatly in favour of the petitioners. Moreover, it was worthy of remark, that the promoters had omitted this compensation-reservoir wilfully; because they had been distinctly warned on the subject, in October, 1861, in pursuance of a requisition made to them two months before, in a letter written by Mr. Bateman to Mr. Simpson, in which they were informed that the owners of the fisheries would expect compensation. Practically, there would be no inconvenience in granting the compensation now; for, though they might begin their works, they would only have to suspend the taking of the water until they had made the reservoir. If, however, they were subjected to any delay, they must recollect that they had brought that delay upon themselves. He repeated that they had based the whole case upon calculations and deductions which were incorrect; and, therefore, he hoped his lordship and the committee would be of opinion that the promoters ought not to be allowed to proceed, without first giving compensation to those who were willing to do all they could, as neighbours, to promote the interests of the citizens of Aberdeen.

Serjeant Bellasis, on the part of the promoters, said there were certain things which might be taken to be established. First of all, that the population of Aberdeen and its neighbourhood was most imperfectly supplied with water; secondly, that for the present population, amounting to 75,000, it would be necessary not only to seek for a supply for them, but to look out for a supply for a future population of 100,000. Now, the maximum quantity the promoters proposed to take being 5 million gallons a day, amounted to 50 gallons a head; and 50 gallons was by no means an unreasonable maximum quantity. Aberdeen was one of our great northern ports. It had not until recently had direct railway communication; but, now that it had a complete railway line going to the north, up as far as Inverness, and communicating with the whole of the south, there was every reason to believe that a great increase of prosperity and of population would attend it. The Dee was the natural source of supply for Aberdeen; and, therefore, the promoters were about to take a maximum supply from it at a point higher up the river—at Cairnton—where they could get the water in a purer state, and by means of gravitation. If the maximum quantity they proposed to take was found to be too great, it would never be taken. If they had over-estimated the future requirements of Aberdeen, the only consequence would be, that they, who had the power of taking 5 million gallons, would not take more than the exigencies of the case might absolutely require. The Dee was so circumstanced at the present time, that there was not a single mill upon it; and, therefore, now was the moment when the promoters were free from the great difficulty which had beset other large towns—that of giving compensation to millowners—to get the maximum supplied. In the case of Glasgow, there was a population of some 400,000 or 500,000 to be supplied, and by the 57th section of their bill the commissioners were limited to the taking of not more from Loch Katherine than 50 million gallons, which was about 100 gallons a head. He mentioned this, not as an unreasonable quantity to give, but as showing that he was not advocating an unreasonable quantity for the inhabitants of Aberdeen. The question, therefore, that remained was this:—were there any such rights as required compensation? Concurrent rights to the usufruct of water were of various kinds. There were several rights, no doubt; but no man could exercise those rights so as to prevent the use of water for the sustenance of his fellow man. Would the 6 million gallons here proposed to be abstracted do any real injury? The petition here was a petition from the greatest enemies to the race of salmon—the stake and bagmen. There was not a single landowner there to petition against the scheme. There had been one, but his objection was not one relative to the abstraction of water. His objection was a mere territorial one. The stake and bagmen not only killed by hundreds, but they impeded, frightened, and drove back the salmon. It was said they did not fish on Sundays, but then their nets were out on Sundays as well as on all the other days of the week; and yet there they were complaining that the taking of water for Aberdeen would sometimes prevent the fish from going up the river. Nobody pretended to say that the floods would prevent the fish from going up, or that the operations of the promoters would prevent the fish from going up to spawn. Were the committee, then, to deny water to Aberdeen, or to propose such terms as to make the scheme entirely impracticable, by imposing upon them a plan of compensation which would be most injurious? He reminded the committee that the floaters did not float their timber down to Aberdeen unless there was a considerable volume of water in the river, and, therefore, no injury could be inflicted upon them by the present scheme. The promoters had spared no trouble nor expense in ascertaining the actual yield of the river, as was evidenced by the number of scientific and practical men who had been examined during the course of this inquiry. If a reservoir were to be made in the place suggested by the opponents—Loch Calleter—then the promoters would have to go 40 miles off, very near the property of the late Prince Consort, and doubtless his Royal Highness's representatives would never allow a reservoir to be erected in that locality. Moreover, there would be a whole host of opponents rising up if this compensation were granted. There would be landed proprietors who had no interest whatever in the fisheries, but who would oppose all changes. The promoters knew very well what the opponents wanted when they asked for a compensation-reservoir, and therefore they refused to comply with the request. They wanted money.

Mr. Forsyth asked how his learned friend could say that?

Serjeant Bellasis thought he had a right to say that that was his opinion, and that he considered it extremely probable that that was their object. He contended that, under the present Act, the compensation-reservoir could not be granted, and that it was both unreasonable and unusual to exact it. If there was one difficulty more than another against which the promoters of great undertakings had to contend, it was the demands—the exorbitant demands—made by persons like these owners of fisheries who possessed rights or supposed rights over streams. There never yet was a case in which compensation-reservoirs had been granted for fisheries; and, if the committee were to establish a precedent now upon the subject, they would be placing a difficulty in the way of large towns which did not exist, and which would be found to be insuperable. If injury were really done, the remedy was provided by the Water-Works Clauses Act. The learned counsel having reviewed the evidence on both sides, concluded by calling in the committee to pass clause 388.

In reply to Sir P. Egerton,

Mr. *Simpson* said, the capacity of the reservoir at Cairnton was 80 million gallons, and that the level of the sill of the acqueduct there was 3 feet below the lowest water-level.

The room was then cleared for a division, and, on our readmission,

The Chairman said, the committee desire that clause 388 be filled up with the words: "Six millions of gallons," in the eighteenth line. A proviso will be brought up and inserted after the clause to prevent smelts entering the reservoir or culvert.

Mr. Forsyth: I understand that that disposes of the question of compensation?

The Chairman: Yes.

All the clauses from 389 to 425 were then agreed to.

On clause 426, which empowered the commissioners to purchase the existing gas-works at Aberdeen,

Mr. Forsyth presented a petition signed by a number of the inhabitants of Aberdeen for a modification of the clause. The clause provided that a bare majority of ratepayers at a public meeting should determine the gas question, and the petitioners thought that it should not be a bare majority, but a majority in number and value. Six of those petitioners consumed 6½ million cubic feet of gas per annum. He proposed to add "In number and value," and to strike out the words "Show of hands."

Serjeant Bellasis said, the clause merely gave a power to the commissioners to purchase the gas-works of Aberdeen, if they should think fit. These commissioners were elected by the ratepayers in the usual manner, and now it was required to put a veto into the hands of certain parties. He opposed the prayer of the petition.

The Chairman said the committee were of opinion that the words proposed to be inserted by Mr. Forsyth ought to be inserted.

In clause 427, which conferred a power to enter into contracts for the purchase or lease of gas-works, it was proposed to add, "to be determined by arbitration, under the Lands Clauses Consolidation Acts."

Mr. Forsyth said there was only one gas-work in Aberdeen, the material of which was £65,000. The shares of the company, being shares on which £2 had been paid, were now selling in the market at prices varying from £4. 10s. to £5. The commissioners could not expect to get the works at cost price. He wished the person who was to determine the value which the ratepayers would have to pay for the works, to put down how much was to be given for the material, and how much for the value in the market of the shares.

Mr. *Hawksley* gave evidence against the adoption of this suggestion. At the same time, he admitted that the suggestion, if adopted, would not do harm. It would neither do harm nor good.

The Committee were of opinion that it was unnecessary to add such a proviso to the clause.

The remaining clauses relative to the purchase of the gas-works were then passed.

Wednesday, March 26.

The committee were occupied for three or four hours to-day in going through the other clauses of the bill. A proviso was introduced to reduce the borrowing powers, under the Act, by £30,000.

Mr. Durnford, parliamentary agent, proposed an addition to clause 88 which would have the effect of exempting the Scottish North-Eastern Railway Company from the payment of the general water-rate under the Act, in respect of a station they had at a place called Ferry Hill, outside the boundary of Aberdeen. The general ground of the application was that they had sunk a well for themselves, and erected a steam-engine, by which they obtained a supply independent of the Aberdeen commissioners.

Serjeant Bellasis opposed the application, and said that if it were granted, every private party who had sunk a well would claim exemption from the general rate.

The COMMITTEE were of opinion that the railway company had no claim to exemption from the general assessment.

A proviso was introduced, in accordance with the decision of the committee yesterday, to prevent smelts from entering the reservoir at Cairnton; and the proceedings terminated.

Miscellaneous News.

MALTA AND MEDITERRANEAN GAS COMPANY, LIMITED.

An Extraordinary General Meeting of the Shareholders of this Company was held at the London Tavern on Thursday, July 3, for the purpose of effecting an alteration in one of the articles of association, and also to determine upon a proposition to undertake the lighting of Corfu. EDWARD HAWKINS, junr., Esq., occupied the chair.

The SECRETARY (Mr. E. P. Rowsell) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, I am anxious not to take up your time unnecessarily, and therefore I will proceed at once to the immediate object of the meeting without entering upon any extraneous matters. You will remember at our last meeting I mentioned that it would become necessary to call you together again soon for the purpose of effecting an alteration in one of the articles of association. The other matter referred to in the notice we had not then in contemplation. I explained at that time, and I will briefly explain again, that it is necessary to cancel the 116th clause of our articles, because that clause does not agree with the terms of our agreement with Messrs. Nicol and Duckworth for the purchase of the Malta works. I shall, therefore, propose at once that clause 116 of the articles of association be cancelled, and that the following clause be substituted for the same:—"Subject to the proviso hereinafter mentioned, all dividends shall be upon the capital of the company, rateable according to the amount paid up, or credited as paid up, on the shares into which the same is divided. And, in apportioning such dividend, it shall be competent to the directors (unless otherwise instructed by a general meeting) to take into account the respective times at which the payments upon such shares shall have been made: Provided always, and it is expressly agreed, that upon the shares issued, or to be issued, to the said William Nicol and Robinson Duckworth, in part payment of the purchase-money for the said works and premises, no dividend shall be payable until 6 per cent. per annum shall have been paid on the residue of the paid-up capital of the company for the time being, not exceeding £46,000; but if, in any year after a dividend at the rate of 6 per cent. per annum shall have been paid upon such residue, there shall remain a surplus applicable to dividend, such surplus shall be applied to the payment of a dividend not exceeding the rate of 6 per cent. per annum upon the said sum of £14,000; and if, after payment at the rate of 6 per cent. per annum upon the said sum of £14,000, there shall still remain any surplus, such surplus shall be divided, without preference, among all classes of shares. And, so soon as 6 per cent. per annum shall have been paid upon the whole capital for the time being (not exceeding £60,000), for two years consecutively, thenceforth the said shares shall be, and shall remain, on the same footing with respect to dividend and otherwise as the remainder of the shares in the said company."

Mr. MORRISON seconded the motion.

The CHAIRMAN, in answer to inquiries by a shareholder, said: The clause, as it stands at present in our articles of association, should of course have been in conformity with the agreement we had entered into; but, through some oversight, or some attempt at abridgment in the terms of that clause, it does not agree. By the proposed substitution which I have read, the terms of purchase will not be at all affected. Those terms, as you are aware, provided, in the first place, that 6 per cent. profit should be paid upon the paid-up capital of the company; and subject to that 6 per cent., if there is any surplus profit, that surplus, or so much of it as the directors think right to distribute, is to be paid to the extent of 6 per cent. upon the £14,000 deferred shares belonging to Messrs. Nicol and Duckworth, in part payment for their works. After paying that 6 per cent., any remaining surplus is to be divided equally among all the shareholders.

The motion was carried unanimously.

The CHAIRMAN: Gentlemen, I will now proceed to the second proposition which the directors have to lay before you. You are aware that by our articles, and in the prospectus issued by us, we gave out that the purpose of the company was the manufacture and supply of gas to the Island of Malta, or elsewhere in any of the British possessions in the Mediterranean. I announced to you, at the last meeting, that our engineer had proceeded to Malta to see that the works were in proper order, and generally to arrange matters that might require supervision, and I am happy to tell you that all the undertakings we have entered upon have proved most satisfactory. At the time Mr. Hodgson Jones was at Malta, a message was received by him from the High Commissioner of Corfu, Sir Henry Storks, who was anxious that we should undertake the lighting of that island. Mr. Jones sent a telegraphic dispatch to us apprising us of the circumstance, and he himself proceeded to Corfu at once. He had several interviews with the High Commissioner and the authorities of Corfu, and the result was that the terms proposed appeared so favourable, that he returned and reported them to the board. Upon giving them our consideration, we also thought them so advantageous to the company that we determined, when summoning you for the purpose of altering the clause in our articles, to ask you to consider, and determine upon a proposition to undertake the lighting of Corfu; and, if you should accept the same, then to empower the directors to take all necessary steps to that end. With reference to the terms offered to us, I will briefly say that we are to pay nothing for the concession, and that we shall have provided for us, without rent for twenty-nine years, admirably situated water-side premises for the erection of our works. At the end of twenty-nine years, those premises are to belong to us in perpetuity on payment of £10 a year. Immediately upon our being prepared to commence lighting, there will be 400 public lamps to be supplied, and the military authorities and private consumers will take 2000 lights. The whole capital required for the purpose of carrying out this proposition will not exceed £10,000, and, therefore, I have no doubt, with decent management, it will prove very advantageous to us. The directors have carefully gone into every one of the items, and they strongly recommend you to undertake it at once. Should you agree in their recommendation, we shall be bound to hold another meeting in a month's time to confirm your resolution on the subject, after which we shall proceed at once to take steps to carry it out. Indeed, so sure are the directors that it will be advantageous that, should you sanction the proposal to-day, we shall immediately enter into provisional agreements for pipes and other things, so that the moment the next meeting is over we shall lose no time in getting on with the work.

A PROPRIETOR: Do you consider that, when all the shares are taken up, there will be sufficient capital to carry out these works?

The CHAIRMAN: Ample. I should say that, so far as our contracts have gone for the works at Malta, they are all within the estimates. In fact, we have seen so much of Mr. Jones's estimates, that I think we may say they are every one of them outside what the cost will be.

Mr. MORRISON: I have much pleasure in proposing—"That this meeting do approve of the proposition to undertake the lighting of Corfu, and hereby authorize and empower the board of directors to take such steps as they may from time to time deem expedient for efficiently carrying out the same in the city and suburbs of Corfu, and to erect all necessary buildings and apparatus, lay down mains and services, and supply such fittings as may be required."

Mr. LAMBERT seconded the motion.

The CHAIRMAN: The £60,000 which we originally contemplated as the capital of the company was intended to cover the expense of lighting Corfu, as it was thought so likely we should be required to commence operations there. I believe, as I said before, our expenses will be found to be within the estimates; and I may mention that the mains at Malta will cost us £800 less than we expected.

The motion was then put, and carried unanimously.

Mr. BACKLER moved, and Mr. DANIELS seconded, a vote of thanks to the chairman and directors for their services, which, having been adopted and acknowledged, the proceedings terminated.

METROPOLIS GAS SUPPLY.

CITY COURT OF SEWERS, GUILDHALL, TUESDAY, JULY 1.

At the Meeting of the Commissioners, this day—Mr. DE JERSEY in the chair—a report was presented from the General Purposes Committee, stating that in considering the various matters referred to them in connexion with the supply of gas to the City, they had experienced inconvenience in consequence of some of these matters having previously been referred to a Special Gas Committee, appointed in September last, and recommending that such Special Committee should be dissolved, and the business not yet disposed of by them handed over to the General Purposes Committee.

The CHAIRMAN, in accordance with a notice previously given, moved—"That the resolution of this court of the 17th of September last, appointing a Special Committee to consider certain questions in relation to the supply of gas to the City be rescinded, and that the several matters which have from time to time been referred to the said committee, and are not yet disposed of, be transferred to the General Purposes Committee for consideration."

Deputy WHITESIDE seconded the motion, which was agreed to.

Dr. ABRAHAM said he wished to move a reference to the General Purposes Committee on a matter of importance and immediate necessity. Every member of the Court was aware of the complications which had arisen in connexion with the supply of gas to the City, and would agree with him that it was desirable the commission should endeavour to relieve themselves from those difficulties by making themselves independent of the gas companies. In considering this matter, it became a serious question whether the commission should not exercise their powers under the Act of Parliament, and burn the gas supplied to the public lamps by meter? He was firmly convinced that, if they were to adopt that course, it would not only be a matter of economy to the citizens of London, but would make the commission independent of the gas companies. They would then be enabled to make any experiments upon the gas which science might suggest, and would not be exposed, as they were at present, to the evils arising from the antagonism of the companies, who ought to work harmoniously together, and the consequent complaints of the public. He would therefore move—"That it be referred to the General Purposes Committee to consider the propriety of burning gas by meter in the public lamps and the estimated cost of the same, and that the committee be authorized to procure and fix to the public lamps two or three dozen meters, and report the result of their experiments to this court."

Mr. GREEN seconded the motion, which was put and carried.

On the police report relative to defective lighting in the public lamps during the previous week, being read,

Mr. C. YOUNG said he thought the committee ought to take into their consideration the propriety of taking legal proceedings against the gas company for breach of contract, in consequence of these frequent reports of lamps being out. If the company supplied gas at a proper pressure, such complaints would never arise.

The CHAIRMAN said the whole matter was before the committee, and he need hardly say that it was a very complicated question—all the more so in consequence of the antagonism of the Central Gas and the Carburating Companies. The committee would give their best attention to it; and he was much in hopes that the resolution just adopted on Dr. Abraham's motion would greatly facilitate its settlement.

Deputy PEWTRESS said he hoped it would, and that one result would be to get rid of the red tin-pots attached to all the lamps.

Some conversation arose upon a suggestion to add to the General Purposes Committee certain members of the late Special Gas Committee; and it was ultimately agreed that Deputy Harrison, Dr. Abraham, Mr. H. L. Taylor, Deputy Waterlow, Deputy Lott, and Mr. Houghton, should be added for the purpose of the inquiries now pending.

TUESDAY, JULY 8.

At the meeting of the commissioners held this day,

A deputation from the inhabitants of Sise Lane, Walbrook, Bucklersbury, &c., attended with a memorial upon the subject of the defective lighting of the public lamps in those localities. The memorial stated that the effectual lighting of the streets of the City was as necessary to the safety of the public as efficient police regulations; that the lamps, during the last few months, had been most badly lighted, and that it was most desirable the commission should at once adopt measures to remedy the evil.

The deputation, in reply to questions proposed by the chairman, said that the lamps were in such a state as to render the streets unsafe; that some of them gave no light at all, and others scarce any. The memorial was signed by most of the principal inhabitants of the locality, who felt great anxiety on the subject.

Deputy LOTT, who introduced the deputation, said, it had been his painful duty to make complaints about the the public lamps from time to time. On a former occasion, after making a complaint, the evil seemed to be remedied for a time, but now it was as bad as ever again. The lamps had those abominable contrivances attached to them for the purpose of uniting the gas with naphtha, whereas, in point of fact, there never had been, and never would be, any happy quiet union between the two. The naphtha-can looked to him like a Jack-in-the-box, and the result of the experiment had been that the lamps burned with a feeble light, and, sometimes, there had been explosions by which not only the naphtha-box, but the lantern had been

blown to pieces. He thought it was pretty clear that the gas manufacturers, and the Carburating Company would never work together harmoniously to produce a brilliant light, and the sooner the connexion into which they had been brought was dissolved the better. He moved "That the memorial be referred to the committee."

Mr. C. YOUNG seconded the motion, which was put and carried.

The CHAIRMAN informed the deputation that the matter referred to in their memorial, had been, for some time, before the commission, that it was a matter of great anxiety to them, and they had given considerable attention to it. The carburetting process had been introduced with the object of relieving the rates of a large outlay in the cost of public lighting, the commission believing that while that end was attained, the light afforded by the lamps would be increased. A great many complaints had arisen, and the committee were now investigating them. The commission were desirous that the public should have the best light they could get, but there had been, unfortunately, contentions between the companies. He hoped that ultimately those differences would be adjusted, and the City lighted better than it had been.

Mr. C. YOUNG said, it would be greatly helping the committee if Deputy Lott, who was now a member of it, would get the police to report the cases in his ward to which reference had been made.

The CHAIRMAN said, it was the duty of the police to make a report of all such cases. Their report for the last week, which was then before him, contained no complaints of defective lighting in the district represented by the memorialists. He observed that that memorial was dated May 25, and asked the deputation whether any improvement had taken place since it was drawn up?

The deputation stated that they attended some few weeks ago, but were not able to present their memorial. There had been no improvement in the lighting since then.

Mr. HAYWOOD read a letter received from the Carburating Company, in which they stated that they would feel obliged if the commission would give them an instalment of £250 upon their contract, as, owing to the numerous impediments they had met with, they had incurred an expenditure of about £800 in fitting up their various apparatuses.

The CHAIRMAN advised the commission not to comply with the request at present. He said there was a large amount due to the gas company in respect of extra gas supplied, and the Carburating Company were by their contract liable for that amount. The committee had had the matter under their consideration in consequence of the Carburating Company having presented a petition praying to be relieved from the payment of it. Until the report of the committee was presented, he thought it would be rather dangerous to pay this amount, and therefore it would be better that the application should stand over until the question of liability for the extra gas supplied was disposed of.

The court agreed in the recommendation, and the consideration of the application was postponed.

METROPOLITAN BOARD OF WORKS.

FRIDAY, JULY 11.

At the Ordinary Weekly Meeting of the Board held this day at the offices, Spring Gardens—Mr. DALTON in the chair, the following tenders were received for the erection of a gas-meter testing-house in White Lion Street, Spitalfields:—

D. Hall, Whitechapel Road	£1367
R. Mann, Kentish Town	1415
W. H. Simms, Cannon Street	1753
J. Walker, Southwark Bridge Road	1593
F. and F. Wood, Mile End Road	1570

Each of the tenders included a sum of £100 for extra work.

Mr. CRESY, in answer to an inquiry, said, that his estimate was £1810, including £100 for extra work.

Mr. H. L. TAYLOR asked how it was that the estimate had been prepared by Mr. Cresy, and not by the architect?

The CHAIRMAN said, the matter was referred to the gas committee, which was a committee of the whole board, and they instructed Mr. Cresy to prepare it.

On the motion of Mr. D'IFFANGER, the tender of Mr. Hall was accepted.

THE GAS-METER QUESTION IN SHEFFIELD.

A Public Meeting, convened by the Mayor (J. Brown, Esq.), in compliance with a requisition numerously and respectably signed, was held in the Town Hall, on Tuesday the 1st inst., "to consider the antagonistic position taken by the directors of the United Gaslight Company with respect to the carrying out the Sales of Gas Act." There was a tolerably numerous attendance. The Mayor presided; and amongst those present were Aldermen G. L. Saunders, Bradley, E. Unwin, and Robson; and Councillors G. C. Holland, W. Crowther, J. Lomas, G. A. Wood, E. Round, Hutchinson, Coggon, Mosley, Woodcock, Moore, Elliott, Booth, Beckett, and Messrs. Ellis (J. Brown and Co.), McTurk, J. Bland. Having read the notice convening the meeting,

The MAYOR said, he had great pleasure in acceding to the requisition of the ratepayers. He wished that the matter should be dispassionately discussed, so that all parties on retiring from the meeting might be satisfied that justice had been done. Wherever they found a number of men, they would find differences of opinion existing amongst them. He had no objection to those differences of opinion so long as they did not cause men to be quarrelsome and disagreeable one to the other. They had all a perfect right to hold their various opinions, and also a perfect right to exercise them with a due regard and respect to the feelings of others. He wished to stand in a position that evening simply as chairman of that meeting, and without expressing an opinion either on one side or the other as to the merits of the question that would be discussed. Connected as he was with the town council of Sheffield, he thought they would all agree with him that, in accordance with the requisition laid before him, it was his duty to come forward and take the chair that evening, and act impartially in the matter without committing himself to either party. He hoped they would give each person a fair and impartial hearing, notwithstanding that some of them might necessarily differ in opinion as to the merits of the case. The question, to some extent, was surrounded with difficulties, and he should be very happy if the result of the meeting should cause them to be modified or removed. He should be very glad if the question could be set at rest, and people's minds settled on the point, and he thought it might easily be done by a little calmness or giving way on the part of the persons interested.

Alderman BRADLEY moved the first resolution, which was as follows:—"That in the Sales of Gas Act passed on the 13th of August, 1859, for the proper regulation of meters and the measuring of gas, which Act is now in operation in the borough, the town council, having appointed an inspector of meters, is deserving the united support of the consumers of gas, giving them, as it does, a legal and certain protection against overcharges."

Alderman SAUNDERS said he thought it was right that the matter should be placed somewhat more clearly before them, in order that they might understand the position of Sheffield at the present time with regard to the testing of gas-meters. He might say that he had only one desire—that everything connected with the dispute between the gas company and the consumers of gas should be treated in a fair, honest, and straightforward manner, without any unfairness or advantage on the side which he advocated. He only wished that they might have the Act of Parliament, which had been passed for the guidance of the public, carried out intact. If they were to punish private individuals for breaking laws, they, as large companies, ought to be careful that they were properly adhered to and carried out with regard to themselves.

The CHAIRMAN thought that Alderman Saunders's remarks would have come better under the next resolution.

Mr. MORTON seconded the resolution, and it was carried.

Councillor MOORE then moved the following resolution—"That, as the directors of the gas company, in attempting to ignore the Sales of Gas Act, by refusing to supply gas to those consumers who have purchased and fixed stamped meters, unless the meters are first given to them to retest, are committing an illegal act, and one to the general injury and detriment of the rights of the gas consumers, the corporation and all other public bodies are requested to purchase and fix their own meters, and resist the attempt thus made to set the Act aside."

Councillor COOPER said he rose with great pleasure to second the resolution. He wished anxiously to learn what Alderman Saunders had to say on the subject; but, at the same time, he thought it was very likely that they would have a lawsuit in the town, unless something was done to prevent one. If they could come to any terms that evening whereby such proceedings might be avoided, they would have accomplished a great work. Should the case go to the Queen's Bench to be decided, whichever party came off victorious, the people would have to pay. He, therefore, trusted that Alderman Saunders or Alderman Unwin would be in a position to lay the matter before them, that it might be settled at once.

Alderman SAUNDERS said he did not wish to take up the time of the meeting unnecessarily, and he should therefore be brief. He said it must be in the remembrance of the gas consumers of Sheffield that for a long series of years, not simply in Sheffield, but in other towns, there were constantly standing quarrels arising between gas companies in regard to the sale of gas. The result of those disagreements was that, in almost every town, two or three gas companies rose up in opposition to existing gas companies to put down what consumers thought were great injuries that had been done to them. Unfortunately, it was so in Sheffield. For certain injuries done to gas companies, those gas companies had amalgamated; and, wherever amalgamations had not taken place, disagreements still existed between gas consumers and gas-makers. In 1859, those disagreements rose to a serious pitch, and Government intervened by passing an Act of Parliament, called "The Sales of Gas Act," for the joint protection of the consumers and makers. That Act came into operation in October, 1860, and the Sheffield town council took the first advantage, and, before any other town council in the kingdom, put the Act into operation, and immediately began to test meters. Formerly, meters acted against the gas consumers, sometimes causing the consumers to pay 50 or 60 per cent. of gas more than had been actually consumed; and, in some cases, they told in favour of the consumer. Before a meter was stamped now, it was the duty of the tester, in compliance with the Act of Parliament, to see that it recorded 2 per cent. in favour of the seller, and 3 per cent. in favour of the consumer. He did not think for one moment that the gas company wanted to act improperly; but could they say, you can have no security, as consumer, if you get your measure from the gas-seller? Although they may act perfectly wrong, they might act perfectly right. The Sales of Gas Act gives powers to parties consuming gas to buy meters of their own, and put them down and use them. When once they had purchased a meter, it was their own; they were at liberty to take it to any other town and use it, or, on leaving a house, they might sell it to any person they thought fit. An inspector was also appointed to examine the meters, who was under a bond of £300 to perform his duty impartially and properly, and, if he acted dishonestly, he was liable to a penalty of £5. Mr. Marriott, a solicitor and parliamentary agent, well up in such matters, said that consumers of gas may use any stamped meter they choose to purchase—that is to say, if they can get the gas—he ought to have said, that—(applause)—if it was sufficiently large to measure the gas, and no gas company could legally object to it. They all knew the tale concerning the man who was advised not to be put in the stocks, but his reply was, that he was already in the stocks. (Loud applause.) By the 20th clause of the Act of Parliament, the gas company, after having supplied a meter with gas, by giving twenty-four hours notice, might cause such meter to be retested, if they supposed it to be wrong—(Question: "By whom?")—by a legally-appointed tester. The same clause also provides that no person connected with such gas company shall be considered a legal tester, so that the Act really appointed who should test a meter. The gas company had a still greater security, for, by the 21st clause of the Act they might, by obtaining permission from the magistrates, have the meter further tested by two joint testers from some other district. The gas company, however, said that, unless they were allowed to retest the meter of the Highway Board, they would not supply it with gas, although such meter had been stamped by Mr. Barlow. He (Alderman Saunders) thought it was impossible for the gas company to tell that the meter was wrong, until they had supplied it with gas. The gas company had power given to them by the Act of 1855 to ask for security. In the case of the Highway Board, they had not asked for it, probably because they thought the highway-rates were a sufficient security. If they failed to supply gas on being requested, after the expiration of seven days, and having asked for security, they rendered themselves liable to a penalty. The Highway Board had given them a proper notice, in order to obtain gas, but still the board was without it. The gas company had presumed that their local Act should supersede the general Act. It was an unfortunate thing that some of the gas directors—he thought, particularly Alderman Unwin—should only see through a pair of old spectacles. (Loud laughter.) They were only able to see the Act of Parliament passed in 1855, and forgot that the general Act had been passed for the protection of the people. If the gas company simply wanted to test a meter, that would be very right; but, if the gas company were allowed to have their own way in contravention to the general Act of Parliament, the people, in a short time, would have the gas company rising up against them. It had been said that they ought to try to settle the matter without expense. If they could settle it, let them try to do so, but do not let them settle it all on one side. He (Alderman Saunders) thought the public knew what the gas company had done in Sheffield, and if they were to submit to the gas company because they did not want to fight, let it be honest submission. If Alderman Unwin was prepared, with all his shrewdness, that night to agree to a proposition, he (Alderman Saunders)

would make one, which was, that they should abide by the decision of the magistrates, and so have no law expenses. (Loud cheering.) Alderman Saunders concluded by saying that the Highway Board would endeavour to take care of the public rights, and, so far as he could assist them, he would see that the public were fairly treated. (Cheers.)

Alderman UNWIN said that, with respect to the persons present, he might say that three-fourths of the meeting knew nothing about the construction of a meter; and he was, therefore, afraid that he should not be able to explain to them what he intended. Alderman Saunders had told them that not one in every 300 meters supplied by the gas company was correct. He (Alderman Unwin) would assure them that the 17,000 meters now in Sheffield were as nearly correct as they would be when they were all stamped by the inspector in Sheffield. So far as he and the gas company were concerned, they were very glad that the Sales of Gas Act had come into operation, and had every disposition to comply with it. Since the Act was passed, they had put down in Sheffield 3530 stamped meters; and since last October they had been obliged to alter all the old meters they had, as not one of them complied with the Act of Parliament now in operation. (Laughter.) Their case was the same as it was with the gas companies in other towns. By that Act of Parliament, meters were to be made so that the pressure of gas could not be increased nor decreased by water, nor vary more than 2 per cent. against the consumer, and 3 per cent. against the seller. He pledged his word, which he was able to prove, that the 1400 meters now in Sheffield, and not stamped, were doing their work correctly. Any consumer of gas that had an unstamped meter, on coming to him, and saying that he wished his meter to be tested, he (Alderman Unwin) would send a man to such person's house, who would take the meter to Mr. Barlow, and it should be tested. If Mr. Barlow said the meter was wrong, he (Alderman Unwin) should be very happy to say so, and make the public aware of it. Many meters had been tested, and as many of them were found to be registering against the gas company as the consumer. In order to prove this, Mr. Unwin gave several instances. He said that before any meter was removed, if the public wished to have it tested, they had every facility. Alderman Saunders had stated that meters were registering from 50 to 60 per cent. against the consumer. He (Alderman Unwin) denied that statement *in toto*. He believed that no meter the gas company had was so far wrong, and that it was impossible to make them do it. The gas company had no wish to do anything but what was right to the consumer. They had never raised an objection to any individual who chose to buy his own meter; but, on the contrary, had given them every facility. The gas company passed a resolution to leave consumers to fix the meters as they chose. At the next meeting of the board, several meters were tested by Mr. Barlow, and he found that meters which he had stamped ought not to have been stamped. It was therefore adopted, on the motion of Alderman Mycock, seconded by Alderman Saunders—"That it is the opinion of this board, it is only reasonable and proper, that in all cases where a consumer proposes to fix a meter not belonging to the company, such meter should, before it is fixed, be submitted to the company for approval, and that all parties be requested to comply with this resolution."

Alderman SAUNDERS: I deny that I seconded that resolution.

Alderman UNWIN: Alderman Saunders denies it, but I give you my word and honour that I can find a dozen gentlemen who were present, and who will confirm my statement. (Applause.) Alderman Unwin then proceeded to state particularly the mode of testing adopted by the Government tester, and by the gas company, showing that the meters registered differently according to the pressure put on. The pressure fixed by Parliament at half-an-inch was not a workable pressure, the pressure used in Sheffield being from 1½ to 2 inches. He had 15 meters there which had been stamped by Mr. Barlow, and he was prepared to leave them in the hands of the mayor, and to prove that they registered improperly. Though he spoke of Mr. Barlow, he wished it to be distinctly understood that he believed Mr. Barlow to be an honest man. He was prepared to prove that Mr. Barlow had made gross mistakes, but he believed that those mistakes were not intentional. Alderman Unwin then proceeded to state the defects at different pressures of the 15 meters referred to. One of the meters, which was shown to the audience, on being tested and stamped by Mr. Barlow, registered correctly, but at that time there was a small hole in the meter, allowing the gas to escape. When the hole was made up, the meter registered against the consumer. Another meter, which was stamped, for every 100 feet of gas that passed through, chalked on 133 feet; another, for every 100 feet that passed through, chalked on 200 feet.

Alderman SAUNDERS said, those were serious charges against the inspector, and perhaps he had a proper answer to each case.

Alderman UNWIN said that he had written to Mr. Barlow, requesting him to be present, as he intended to make some remarks about him. (Applause.) [Mr. Barlow was called, but did not answer.] Alderman Unwin went on to say, that another stamped meter, for every 100 feet that passed through, chalked on 233 feet; and, for every 200 feet that passed through, it registered 466 feet. (Laughter). Another meter positively registered backwards—chalked off. (Loud laughter.) If the meter stood at 500 feet, and 100 feet were passed through, it would register 400 feet; another 100 would reduce the quantity to 300. (Renewed laughter.) A stamped meter put down at the Wesley College was registering considerably against the gas company at a given number of feet per hour and at the usual pressure. The stamped meter put down at the new hotel at the Victoria Station, registered fast and slow, according to the number of feet passed through per hour, varying from 7 per cent. against the consumer to 7 per cent. against the gas company. Smith and Frierson had received notice from the gas company that they required the meter to be re-examined. It had been examined, and found to be registering against the consumer to the rate of 4½ per cent., though it had been previously stamped by the inspector. The gas company were most desirous of acting fairly and properly. The directors would be very sorry to fly in the face of the recommendation of the magistrates. He was desirous to leave it to the mayor to say what was best to be done. If the mayor chose, he might call in two or three other magistrates; and, what they laid down as the best course for the gas company to pursue, he was sure that the gas company would be glad to take to it. The object of the gas company was to save the trouble of the consumers generally, and he was sure the consumers had no cause to complain of what the gas company were doing. (Applause).

Alderman SAUNDERS said that if Alderman Unwin would consent that the magistrates decision upon the Act of Parliament should be binding upon him, he would agree, on the part of the Highway Board, that the magistrates decision should be binding upon them. (Applause).

Alderman UNWIN said he had not gone there to argue the law with Alderman Saunders; but he was empowered to say that if that matter was left to the mayor, or any of the magistrates, and if they took the matter, and recommended what course should be adopted—the best for the gas company, and the best for the consumer, he would agree with it. The question of law must be left to the lawyers; but still he was prepared to do that which was best for all parties. (Applause).

Alderman SAUNDERS said, Mr. Unwin had picked out 25 meters out of 3000, and of one-half of those meters, he would answer for it, explanations could be given. The meters referred to had been in the possession of Alderman Unwin—(Hear, hear)—and a great many of them were wrong by over-pressure. With regard to the resolution referred to by Alderman Unwin, there was a testing of meters at the gas-office, which Alderman Mycock and himself objected to, because they had been in Alderman Unwin's possession for three weeks. One was brought down on a barrow from the inspector's office, and it was found to be right. On going up stairs after that, Alderman Unwin proposed that all parties should be compelled to send their meters to the gas-office after being tested. He (Alderman Saunders) objected to it, and Alderman Mycock fought hard on the part of the people. Alderman Mycock, to meet that, did propose as an amendment that it was advisable, simply that it was advisable, setting aside the right that they should, but simply that it was advisable, and if not advisable, that they should then be supplied with gas according to the Act of Parliament. Alderman Unwin had not touched the question of law, but simply went upon a parcel of meters, and he (Alderman Saunders) did not believe half of them. (Laughter and applause.)

Alderman UNWIN said, that not 200 meters had been stamped for consumers of gas in the town; they were principally stamped for the gas company. He was prepared to say that 25 at least of the 200 were wrong in some shape or other.

Alderman SAUNDERS: Not when they come from Mr. Barlow.

Mr. BLAND said, he had been told by Mr. Barlow that it was not possible to tamper with stamped meters without breaking the seal.

Mr. JOHN WILSON said, that at first Mr. Barlow stamped the meters in such a way that they might be tampered with without breaking the stamp, and they were put into a different position at Alderman Unwin's suggestion, in order to remedy that.

Alderman SAUNDERS: Mr. Barlow denies that he altered the position of the stamp but at his own will.

Mr. WILSON proceeded to state that it was the workable pressure that caused the variation in the registering; and, while on his legs, he met with frequent interruptions, one of which was, "Look out, John! Verity is coming." (Laughter.)

Alderman UNWIN proposed, as an amendment—"That the question in dispute between the gas company and certain gas consumers respecting the testing of meters be referred to the mayor, Mr. Dunn, and Mr. Henry Vickers; and that the gas company and the consumers abide by their decision." Mr. Dunn and Mr. Vickers were the magistrates who heard the case last week, and it so happened that they did not exactly agree, and therefore he was acting fairly in putting them together. He was very anxious that the matter should be amicably settled, and that the gentlemen proposed should recommend the course the gas company should pursue. (Applause.)

Councillor CROWTHER seconded the amendment.

Alderman SAUNDERS said, it would not be right for the gentlemen named to come to some decision as to what was equitable and fair, but they must decide what was the Act of Parliament, what was the law. Whatever recommendation they made, any private consumer might say "That is not the law—I go upon the law;" and the question would then require to be settled formally. (Applause.) Let the worthy mayor go to the town hall on Saturday, when the case between the Highway Board and the gas company would be heard. The Highway Board were the most obliging people, perhaps, in the town. (Laughter.) The Highway Board wanted justice, and the question was, were they allowed to buy meters according to the Act of Parliament, or was Alderman Unwin to step in and tell them a lot of twaddle? (Applause.) He could, he would be bound to say, have given an answer to three-fourths of the meters referred to by Alderman Unwin, if he had had notice of them.

Councillor J. BECKETT: What a pity you did not give him notice!

Alderman SAUNDERS: That is Councillor Beckett, gentlemen. (A laugh.) They can have the meter from the highway-offices in half an hour after we have gas. Come, Alderman Unwin, give us gas for half an hour. (Laughter.) We want justice and law, and we want gas, and if we can get justice and law, we will have gas. (Applause.)

Alderman ROBSON supported the amendment. That was a private quarrel, a personal difference between Alderman Unwin and Alderman Saunders. There was no doubt about it.

Alderman SAUNDERS: I stand up for the public.

Alderman ROBSON: And so do I stand up for the public.

After some further conversation,

The MAYOR said he should be glad to see the Highway Board and the gas company reconciled. There was nothing so disastrous as litigation, and generally the only conclusion arrived at was, that each party had to pay their own costs. If they would refer that matter to him, in his official capacity, empowering him to confer with Mr. Albert Smith and four magistrates, he promised them, as far as he had ability, they should have a fair and impartial decision. (Applause.) If that was adopted, he thought both sides would be better satisfied, and the public mind would be appeased.

Alderman SAUNDERS: That won't decide it for the public.

Councillor BECKETT: Then let them go to law.

Alderman SAUNDERS: We must have the legal decision of the magistrates to go upon, or else anybody may raise a dispute who feels disposed. Attend here on Saturday. (Hear, hear.)

After a few words from Mr. Mansfield, Mr. Mitchell, Mr. Hague, and Councillor Hutchinson,

Councillor WOODCOCK said there was a great principle at stake, and he hoped they would stand by the law, and defend their own rights and interests.

Councillor ELLIOTT said there must be some reason on the part of the gas company in not supplying gas according to law, especially when the Highway Board were prepared to allow the meter to be examined in half an hour after the gas was supplied. (Applause.)

Alderman SAUNDERS said the Highway Board would agree to the decision of the magistrates; and before they would go to a superior court they would call a vestry meeting, add put it to them as to what they should do.

After a few words from the mayor, the amendment was put to the meeting, and lost. The original proposition was then put, and carried.

A vote of thanks to the chairman concluded the proceedings.

The following correspondence subsequently appeared in the *Sheffield Daily Telegraph*:—

TO THE EDITOR OF THE "SHEFFIELD DAILY TELEGRAPH."

Sir,—In your report of the meeting last night on the gas-meter question, you make Alderman Unwin to say, "that he had written to Mr. Barlow requesting him to be present, as he intended to make some remarks about him." And you add, "Mr. Barlow was then called, but did not answer." I have only to say that I did not attend for several reasons.

1st. Because I received no such notice, either verbal or written.

2nd. I should feel myself out of my path of duty to attend under such circumstances.

3rd. If I have failed in my official duties, let it be investigated before a proper tribunal, giving me particulars and due notice.

Had I presented myself at that meeting, I am sure I should have had a fair hearing, but I should have had little to say, as I could not have allowed myself to be drawn into a personal conflict with Mr. Unwin, and thus have the great object of the meeting defeated. And to take any part in the legal question would have been most unbecoming.

I have just had a visit from a young man, sent by Mr. Unwin, to pursuade me that he put into my hands a note from Mr. Unwin at a quarter to seven last night. I have no recollection of such an event, and can find no such note—a most singular lapse of memory on such an hypothesis.

Of course, I deny all the statements made by Mr. Unwin as to sundry meters, in the manner stated, and the inferences he wished the audience to draw from them.

I am, sir, yours truly,

23, *Figtree Lane, Feb.* 2, 1862. WM. BARLOW.

TO THE EDITOR OF THE "SHEFFIELD DAILY TELEGRAPH."

Sir,—In reply to a paragraph in a letter which appeared in your yesterday's publication, signed "William Barlow, 23, Figtree Lane, *February* 2, 1862," of which the following is a a copy:—"I have just had a visit from a young man, sent by Mr. Unwin, to persuade me that he put into my hands a note from Mr. Unwin, at a quarter to seven last night. I have no recollection of such an event, and can find no such note—a most singular lapse of memory on such an hypothesis."—I have to say that I am the young man he alludes to. Mr. Unwin having yesterday heard that Mr. Barlow had said he had not received the letter, asked me who I delivered it to, and I at once replied, "To Mr. Barlow," who, at the time I gave it to him, was standing in his own yard, talking to two gentlemen. Mr. Unwin then said, "Pray go up to Mr. Barlow to try to call to his recollection the circumstance." I went immediately, but he denied it to me. I have, therefore, no alternative but to appeal to the two gentlemen I alluded to, who are entire strangers to me; but I hope they will see this letter, and come forward to substantiate my statement.

I am, your obedient servant,

ARTHUR MOSS,

A Clerk in the employment of the Sheffield Gas Company.

July 3, 1862.

[The date *February*, instead of *July*, is a mistake for which Mr. Barlow is not responsible.—Ed. *S. D. T.*]

TO THE EDITOR OF THE "SHEFFIELD DAILY TELEGRAPH."

Sir,—Mr. Barlow, in a letter published in your paper of yesterday's date, says:—"Of course I deny all the statements made by Mr. Unwin as to sundry meters, in the manner stated, and the inferences he wishes the audience to draw from them."

My answer to the above is, I am prepared, and quite willing, to prove to the satisfaction of the mayor, and any number of magistrates who will give themselves the trouble to investigate the subject, that what I said at the public meeting last Tuesday evening in reference to Mr. Barlow was true.—Yours faithfully,

Gas Office, July 3, 1862. E. UNWIN.

TO THE EDITOR OF THE "SHEFFIELD DAILY TELEGRAPH."

Sir,—Mr. Moss's letter throws no light on the subject of the notice said to be given to me to attend the meeting on Tuesday evening last; the matter is *in statu quo*, and, I fear, it will remain there. To this day, my memory is a perfect blank, both as to his visit on Tuesday evening, the letter he says he gave to me, and, in fact, no such letter has been found by me. If I could find myself in error, I would promptly give him the benefit of it, as all I wish in this matter is the truth.

I can only gather what is *in* Mr. Unwin's letter, which he says he wrote me, by your report of the meeting. My solicitor, and other gentlemen of the town, all say that I did right to absent myself from such a meeting, even had I received a note from Mr. Unwin to attend. That a public meeting was not a proper place for the investigation of charges against me, even supposing that due notice had been given me, with a detailed list of the charges I was required to answer. It is no great marvel that Mr. Unwin could produce fifteen meters, stamped by me, which *now* register unfairly. I cannot be answerable for meters after they leave me, when they fall into the hands of dexterous and clever men, who understand the construction of a gas-meter. I have stamped upwards of 5000 meters, and may have made some errors (for I am not infallible), but I have not seen one yet which was not capable of explanation.

There are two modes of testing meters, both open to me, and I am quite willing to adopt either course, as I may be directed; one by the drum, which is the measuring-vessel of the meter; and the other by the index. I am confined by the Act to test *at half-inch pressure only*.

At the first, and for several months, I tested by the index only; afterwards, at the suggestion of the servants of the gas company (who were very pressing for my services), I commenced testing by the drum only. This is the shortest way, and equally correct when all is fair. Now, Mr. Unwin can tell you why a meter was sent up to me for testing with the drum disconnected from the index. This meter I found correct by the measuring capacity, and stamped it. Of course this was for a given purpose, as Mr. Unwin would not allow it to be sent out till it was re-stamped, for it would give his customer all the gas he wanted without payment; and it could not be re-connected without breaking my first stamp.

The same will apply to a meter sent to me which registered backwards. Why did he send it me in such a condition? He knew I tested *only* by the drum, and should not find out the trick; therefore, it was a case against me.

Mr. Unwin is well aware that there is a certain class of meters that slightly vary their registration, both by the pressure applied and the quantity passing through; and that if they measure correctly at half-inch pressure, with the proper quantity passing, I *must* stamp them; the Act compels me. Was it fair to me to withhold this fact?

Mr. Bland said at Tuesday's meeting, that I had told him "It was not possible to tamper with stamped meters without breaking the seal." I referred only to the water-line, and in the ordinary working of a meter, and of recently-stamped meters; it is just possible, with great skill and dexterity, to *fix* the valve of a water-meter *partly open*—then slowly to draw out the water by syphon, till it register 10, 20, 50 per cent. slow; yea, to pass the gas without registration. This is well known at the gas-works. There may be other modes of dexterous trickery by skilful men which I know not. Indeed, I have been told within the last few days by ingenious men, that they can do such things without breaking the seal. What *may* be done to a meter in a workshop is not the matter to be discussed now.

It may be that the Sales of Gas Act is defective, and requires alteration, but let these defects be altered in the usual way, at the proper time, and not make them the occasion of an attack upon a public officer, who tries to discharge his duty fearlessly and honestly.

I am quite willing that an investigation should take place about these fifteen meters, but it must be by competent persons, who will allow a full and impartial hearing of both parties, where bold assertions go for nothing, and facts only determine a decision on each meter.

I am, sir, yours very truly, WILLIAM BARLOW.

23, *Fig Tree Lane, July* 4, 1862.

TOWN HALL, SHEFFIELD, SATURDAY, JULY 5.

(*Before* H. VICKERS, *Esq.*, W. SMITH, *Esq.*, *and* W. F. DIXON, *Esq.*)

A notice having been served upon the Sheffield Gas Company by the Highway Board for a supply of gas to their offices on the 19th ult., Mr. FRETSON, who was instructed by the Highway Board, appeared in support of an information, which had been laid against the gas company, demanding a penalty of £1 from them for neglecting to supply the Highway Board with gas after the expiration of seven days, the time specified in such notice. Mr. WAKE attended on behalf of the gas company.

Mr. FRETSON said, he should prove to the magistrates that the notice, which had been duly signed by the chairman and two members of the Highway Board, was served upon the secretary of the gas company on the 19th of June last, and more than seven days having elapsed since the service of that notice, the gas company had rendered themselves liable to a penalty of £1 per day for every day they neglected to comply with such notice. He apprehended that the question for the magistrates to consider was whether the 83rd and 95th clauses of the Sheffield Gas Act of 1855 were superseded by the 16th section of the Sales of Gas Act. Subject to the provision of the Gas-Works Clauses Act of 1847, the gas company were empowered by their private Act to lay any pipe into, or through any building, and put down any apparatus therein necessary for securing a proper supply of gas, and also for measuring the same. By the 95th clause of their Act, every private consumer of gas supplied by the company was bound, at the company's request, to consume his gas by a meter, which should be approved by the company before it was used. But, by the general Act of Parliament, every consumer of gas supplied to him by the company might purchase and use his own meter, providing it was duly stamped, and the quantity to be burned per hour did not exceed that which was marked on the outside of his meter. Provision was also made for properly-qualified inspectors to be appointed, in order that justice might be done both to the supplier and consumer. He (Mr. Freston) would, therefore, submit to the bench that the 16th section of the General Act, repealed, by implication, the two inconsistent clauses of the private Act of Parliament. He believed that, notwithstanding the provisions of the Act of Parliament, the gas company still persisted in thinking that although the meter had been stamped by a properly-appointed inspector, it ought to be sent to their offices to be examined and tested.

Mr. WAKE said, he would admit that the meter was such as was stated in the notice that had been served upon the gas company.

Mr. *W. Chapman*, assistant-surveyor, said he saw the notice produced signed by the three gentlemen whose names were upon it, and on the 19th of June last, he served a duplicate of it upon Mr. Roberts, the secretary, at the gas company's offices. There was a 15-gaslight meter at the offices of the Highway Board, and it had a plate upon it showing its measuring capacity. The Highway Board were still without a supply of gas.

Cross-examined: On the 24th ult., Mr. Moorhouse and two assistants came to the offices of the Highway Board with a meter, stating that they had come to fix it between the main and the service-pipes. He (Mr. Chapman) said he could not give them authority to fix such meter in the cellar beneath the offices until he had consulted with the board. He did not object to their putting the apparatus down at the outside of the building. Mr. Moorhouse requested to know when the next board meeting would be held. After being informed, he said that that time would not suit his purpose, as the notice would have then expired. He (Mr. Chapman) did not promise to call a special meeting. The meter at the offices of the Highway Board was not like that which they previously had. There were no burners as yet fixed to the pipes, but there were brackets prepared for fifteen. There was a meeting of the Highway Board last Wednesday, at which Mr. Moorhouse or any one else could have attended if he had felt disposed.

Mr. *W. Barlow* said he was the inspector of gas-meters appointed by the town council of Sheffield. He had examined the meter at the offices of the Highway Board. It was a 15-light meter; and, on finding it to be correct, he stamped it. The meter was capable of registering gas for fourteen burners, or more.

Cross-examined: He thought the meter had been obtained from Messrs. Benjamin Vickers and Co.

Mr. H. VICKERS here explained that Mr. Benjamin Vickers had at present, and even at that time, no interest whatever in the firm which had been mentioned, although his name was still retained by the firm.

Mr. FRETSON said that if the gas company did not like the meter, they must first supply the board with gas, and a fresh meter could afterwards be obtained on receiving a notice to that effect.

Mr. WAKE said the gas company had not the slightest wish to evade the Sales of Gas Act, and it was their interest, as well as their desire, that it should be carried out. They however, reserved to themselves the right of contending, whenever factious proceedings were taken against them, whether the Act was really in operation, and whether it was applicable to them. The Act only came into operation last October, and the gas company had 4000 or 5000 meters which fulfilled the requirements of the Act, now ready to be used. The gas company had unanimously passed a resolution that it was reasonable and proper, under the 95th section of their own Act that, in all cases where a consumer purchased his own meter, before it was fixed it should be submitted to the gas company for their approval. The Highway Board had been asked to do so, in order that their meter might be tested by Mr. Barlow before it was put down. Not having complied with such request, he (Mr. Wake) might say, that if the Highway Board still contended that they had the law on their side, they could not find fault with the gas company for taking part in the objection. He did not think the Highway Board were consumers of gas within the meaning of the Sales of Gas Act.

Mr. FRETSON: That was just what they wanted to be, and what they were complaining of. The section of the Act to which he had previously referred only applied in cases where there was a supply of gas, or where a contract had been entered into for a supply.

Mr. VICKERS: A man surely cannot be called a consumer of gas before he has purchased a meter.

Mr. WAKE observed that, the notice had only been signed by three persons, who were not the owners or occupiers of the property, in the absence of the other members of the board.

Mr. WILLIAM SMITH said they had a right to assume that there had been a meeting duly called for the purpose, and that the notice had been served under the immediate direction of the board.

Mr. WAKE: There was no mention of a meeting having taken place.

Mr. W. SMITH thought it would be much better if the point could be discussed on which the question depended.

Mr. WAKE said that the board had merely given notice that they required a supply of gas, and they ought to have stated that they required a supply from the mains. He also contended that the Gas Act was not in operation in Sheffield, and that the penal clauses were suspended by a suspending Act.

Mr. W. SMITH thought it was evident that the gas company were afraid that persons who put down their own meters consumed more gas than they ought; therefore, on the other hand, the public had a right to be afraid that, if the gas company furnished the meters, it would be the other way.

Mr. ALBERT SMITH (magistrates clerk) supposed the gas company were contending for a right which they did not mean to exercise in every case.

Mr. WAKE said, if the magistrates did not give the company permission to do what they required, they would constantly have to be excavating, and would thereby create a public nuisance. They were willing to supply the board with gas, but the apparatus required a check to prevent more than 75 feet of gas from entering their meter in the hour. The gas company wished to carry out the question without litigation; and, whatever recommendation the bench thought fit to make with respect to that, or any other matter, they should be glad to accede to.

After some further objections from Mr. Wake, the magistrates retired to consider the case. On coming into court,

Mr. VICKERS said, they had given the question their best consideration. They were of opinion that, when two Acts of Parliament differed, and especially when there was such a wide contradiction of an old Act in favour of the public, that section 95 of the private Act had been virtually repealed by by 16th section, and other provisions of the Sales of Gas Act. Under those circumstances, they should grant a conviction; but, if the two parties could

arrange to make some terms between themselves, whereby the question might be settled, the magistrates would be glad to suspend their conviction.

Mr. WAKE: Had the bench, in founding their conviction, any suggestion to make on the point as to what they considered really was legal?

Mr. A. SMITH thought the gas company had better take the recommendation of the bench, and supply the board with gas.

Mr. WAKE said, probably the gas company would do so, as the matter was not worth contention.

EXPERIMENTS ON ILLUMINATION WITH MINERAL OILS.

By JAMES C. BOOTH and THOMAS H. GARRETT.

[From the *Journal of the Franklin Institute.*]

On account of the abundant supply of petroleum, or mineral oil, and its increasing consumption for illumination, we were induced to make some experiments in a practical way, for determining its illuminating power and economic value.

As in all such experiments, we also found the lack of a reliable standard of comparison, but, as our object was purely practical, we employed Philadelphia city gas as our standard, because of its convenience, the tolerable accuracy of its measurement, and its sufficient uniformity of composition through the time required for each series of experiments. We measured the gas by a water-meter made for nice measurements, and which was kindly loaned to us by Dr. Charles M. Cresson. The gas-jet, a good fish-tail burner, was attached to the top of the meter, and was fixed at the uniform distance of six feet from the photometer. The distance of the lamp, &c., giving equal light to the gas-jet, was measured on the opposite side of the photometer. We may mention once for all, that, except in two cases expressly stated, all the flames were raised to their fullest height, just below the point of smoking.

We first ascertained that the results of experiments at a different flow of gas were not reducible to those of a uniform flow with any degree of accuracy with the burner we employed, and without a regulator, as indeed we might have concluded without experiment. The following Table shows this:—

TABLE I.

	No. of the Experiment.	Flow of Gas in Cubic Feet per Hour.	Intensity of Gas. Intensity of Lamp = 1.	Intensity of 2 and 3, calculated from 5·3 to 5·6 and 4·1.	Intensity of 2 and 3, calculated to that of 5·3, from the observed Intensities at 5·6 and 4·1.
Lamp A.	1	5·3	1·5410	1·5410	1·5410
	2	5·6	1·6531	1·6288	1·5645
	3	4·1	1·3486	1·1650	1·7433
Lamp B.	1	5·3	1·8455	1·8455	1·8455
	2	5·6	2·0736	1·9848	1·9281
	3	4·1	1·6239	1·4277	2·0992

Although we found that, where the flow of gas differs only by ·1 or ·2 cubic feet per hour, the calculated intensity approached to that determined by experiment, yet we concluded to present only the results of observation, as better for practical purposes.

We first determined the relative economy of several coal and mineral oils, and of burning fluid, at the request of Mr. Horace J. Smith, with the following results. The gas was flowing at the rate of 5·3 cubic feet per hour. The oils were burned in the same kind of lamps as in the subsequent experiments, and the burning fluid in the ordinary lamp used for it, with two divergent cylindrical wicks.

TABLE II.

Name of Oil.	Intensity of Lamp. Gas = 1.	Gallons burned during Flow of 1000 Cubic Feet of Gas.	Gallons giving equal Light to 1000 Cubic Feet of Gas.	Relative Amount burned. Best = 100.	Specific Gravity of Oil at 68° F.
Natrona . . .	·6274	1·545	2·463	100	·7935
Portland . . .	·6158	1·558	2·529	103	·8077
Lucifer . . .	·6158	1·595	2·590	105	·7918
Lucesco . . .	·5935	1·670	2·813	114	·7940
Burning fluid .	·1554	1·819	11·699	475	

As experiment thus proved that there was no great difference between the mineral oils, we selected one of them, "Lucifer Oil," and employed it in all subsequent experiments. In most of these, the common coal-oil lamp was used, with a flat wick of 0·7-inch breadth, by 0·08-inch thickness, and a hemispherical cap or deflector, with a lune or very elongated oval slit, through which the flame issues.

We ascertained that a perfectly straight cut of the wick yielded tolerably uniform results, differing but a few per cent. in relative economy, as the following shows:—

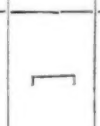
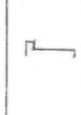
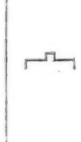
TABLE III.

No. of Experiment.	Intensity. Gas = 1.	Gallons of Oil burned giving equal Light to 1000 Cubic Feet of Gas.	Relative Amount for Equal Light.
1	·61579	2·78	100
2	·61579	2·80	101

These results were obtained at the same time with two lamps, but at different times and pressures of gas, they show an extreme variation that may amount to 15 per cent., chiefly due to the variation in our standard, burned from the same jet, at different pressures.

We then determined the influence of the shape of the top of the wick to ascertain the relative economy of care or carelessness in trimming the wick, with the following results. The 1st column in Table IV. states the number of the experiment; the 2nd, gives the trim of the top of the wick; the 3rd, the shape of the flame; the 4th, the intensity of the light, compared to gas as unity; the 5th, gallons of oil consumed during the flow of 1000 cubic feet of gas, at the rate of 5·4 cubic feet per hour; the 6th, the gallons of oil that would be consumed to produce an equal light with 1000 cubic feet of gas at the same rate of flow; the 7th, the relative amount consumed for equal light, assuming the best at 100.

TABLE IV.

1. No. of Experiment.	2. Trim of Wick.	3. Shape of Flame.	4. Intensity of Light of Oil. Gas = 1·0.	5. Gallons of Oil burned during Flow of 1000 Cubic Feet of Gas.	6. Gallons of Oil giving equal Light to 1000 Cubic Feet of Gas.	7. Relative Amount consumed for equal Light.
1			·6267	1·614	2·576	100·0
2			·4727	1·345	2·846	110·5
3			·3906	1·125	2·880	111·8
4			·4259	1·247	2·929	113·7
5			·4171	1·223	2·932	113·8
6			·4082	1·199	2·936	114·0
7			·3735	1·150	3·078	119·5

A simple inspection of the 7th column shows that by any other method of trimming the wick than by a straight cut, No. 1, there is a loss of oil to obtain an equal amount of light, and that this loss may amount to from 10 to 20 per cent., where the wick is very badly trimmed. The trim of wick was much exaggerated over what is likely to occur in practice, as shown in the 2nd column; but, in another experiment, in which the salient and retiring angles, as Nos. 3 and 7, were much more obtuse, the loss amounted to 4 per cent. in a trim like No. 3, and to 7½ per cent. in one like No. 7. In all our trials, the straight trim, No. 1, proved most economical, and that with a re-entering angle, No. 7, the worst. In giving a straight cut, threads of the woof are apt to project above the cut, or loose threads are allowed to remain on the wick. Their influence is shown in Nos. 5 and 6, and they may occasion a loss as high as 14 per cent. It frequently happens that in giving a straight trim, the two corners are apt to be left jagged, and to produce pointed and wasteful flames. We then tried the influence of cutting off these corners by a slight oblique cut after trimming straight. The loss was only 5 or 6 per cent., although our trim was much exaggerated. The best method of obtaining the fullest amount of light is to trim the wick straight across, and test the shape of the flame by lighting the lamp temporarily, and then, if necessary, to re-trim it until the shape approaches that of No. 1, presenting as even a top as practicable.

We determined the relative economy of a full and two-thirds sized flame in the same lamp, and that of two smaller lamps, with the results in Table V. The columns are numbered, as in Table IV., the trim of wick, and shape of flame, columns 2 and 3, being omitted. In experiments 1 and 2, the same lamp was employed as before. In experiment 3, a similar but smaller-sized lamp was used, with a wick 0·4 inch broad by 0·08 inch thick. In experiment 4, a small chamber-lamp was used, with a cylindrical wick 0·15 inch diameter (like that of a common oil-lamp), and a flat horizontal deflector, with a circular hole through which the flame issues. This flame is a very elongated cone of nearly 1½ inch height at its fullest without smoking, and ⅛ of an inch diameter. The flow of gas was 5·1 cubic feet per hour.

There appears to be little waste (only 3 per cent. for equal light) in burning a lamp at two-thirds the fullest height of the flame (compare Nos. 1 and 2); nor is there much difference (3 per cent.) between the larger and smaller lamps, Nos. 1 and 4. Of course, the chamber-lamp, experiment 4, is not designed to give much light, and hence it appears to lose 60 per cent. in economy to obtain an equal amount of light from it. Its true economy consists in the very small quantity of oil consumed by it, with sufficient light for the purpose for which it is used, during the flow of 1000 cubic feet of gas (at the rate of 5·1 cubic feet), which is only one-third of a gallon. We shall revert to relative cost further on.

TABLE V.

1. No. of Experiments.	4. Intensity of Light of Oil. Gas = 1.	5. Gallons of Oil burned during Flow of 1000 Cubic Feet of Gas.	6. Gallons of Oil giving equal Light with 1000 Cubic Feet of Gas.	7. Relative Amount burned for equal Light.	Remarks.
1	·6158	1·709	2·776	100	Large lamp, full flame.
2	·4444	1·278	2·875	103	Large lamp, ⅔ full flame.
3	·3735	1·071	2·867	103	Smaller lamp, full flame.
4	·0772	0·345	4·475	161	Chamber-lamp, full flame.

While making these experiments on the oils, we concluded to extend them a little further, in order to make a comparison of the oils with several kinds of candles in common use. The results are given in Table VI., in which columns 1, 2, 4, 5, 6, and 7, correspond to the same of Tables IV. and V., except that pounds a.d.p. are used instead of gallons (column 3, shape of flame, is omitted). Two candles were employed each experiment, but the results in columns 4 and 5 are reduced to the effect of one candle. This, of course, does not affect the quantities for equal light in columns 6 and 7. Paraffin candles were employed in experiments 1 and 2, spermaceti in 3 and 4, and adamantine in 5. In experiments 1, 3, and 5, the wicks were arranged so as to burn the material to the best advantage; but in 2, one of the paraffin-wicks, and in 4, both of the sperm-wicks, were only slightly curved, and had small beads of snuff on their tips, as shown in column 2. The rate of gas is 5·1 cubic feet per hour.

TABLE VI.

1. No. of Experiments.	2. Shape of Wick.	4. Intensity of one Candle. Gas = 1.	5. Pounds of Candles burned during Flow of 1000 Cubic Feet of Gas.	6. Pounds of Candles giving equal Light to 1000 Cubic Feet of Gas.	7. Relative Amount burned for equal Light.
1		·1019	3·507	34·42	100
2		·0957	3·507	36·64	106
3		·1050	3·912	37·25	108
4		·0868	3·912	45·07	131
5		·1080	5·098	47·18	137

A comparison of the results in column 7, compared with the shape of wick in column 2, shows the importance of not permitting beads of snuff to accumulate on the ends of the wick. To obviate it, it is only necessary to keep the wick bent nearly at right angles, as shown in experiments 1, 3, and 5, in column 2, so that the air will keep the wick *snuffed*, by burning off the extremity.

It is hardly fair to compare candles and gas for equal light, as in column 6 of Table VI., because the former are rarely employed for illuminating a large space, to which gas is peculiarly well adapted. If we compare the results of two candles, which give a fair amount of light for reading and work near them, we have only to double the figures given in column 4 for intensity, and in column 5 for the quantity used in the same time as 1000 cubic feet of gas flowing at the rate of 5·1 cubic feet per hour. This quantity would be 7 lbs. for paraffin, 7¾ lbs. for spermaceti, and 10 lbs. for adamantine candles.

If we now make a comparison of the relative cost of gas and mineral oils, we shall first suppose them employed for illuminating a large space. In this case, we can only compare them with reference to an equal amount of light. When burning to fair advantage, it appears from Table III., experiments 1 to 4, and Tables IV. and V., experiment 1, that 2½ to 2¾ gallons of oil give equal light with 1000 cubic feet of gas. To these we will add, by way of contrast, the best results with candles in Table VI., experiments 1, 3, and 5. We have added a column for cost of 1000 cubic feet of gas, of one gallon of oil, and of a pound of candles; and, finally, the column of expense for equal light.

TABLE VII.

	Name of Material.	Quantity for an equal amount of Light.	Price of Unit of Quantity.	Cost of Quantity for equal Light.
	Gas	1000 cubic feet.	2·25 dols. per 1000.	2·25 dols.
	Petroleum	2⅝ gallons.	0·45 „ gall.	1·07 „
Candles.	Spermaceti	37 lbs.	0·50 „ lb.	18·50 „
Candles.	Paraffin	36½ „	0·32 „ „	11·68 „
Candles.	Adamantine	47 „	0·25 „ „	11·75 „

It will be observed that we have taken fair retail prices. It is hardly worth while to call attention to the extravagance of employing candles for illumination. It is more to our purpose to compare gas and mineral oil. Even allowing the price of gas to be reduced, we find that it costs twice as much as mineral oils for producing equal light. A moment's consideration, however, will show that, for all ordinary purposes, the comparison for an equal amount of light is an unfair one for the oil. Gaslights are fixed, or at best can be moved by a swing-joint or drop-light within a very limited space; so that any work to be done must, however inconvenient, either be carried near to the jet, or we must employ a larger amount of gas, proportioned to the *square* of the distance—*i. e.*, at twice a given distance, four times as much gas is required for an equal effect, &c. On the other hand, the lamp can be moved to any position most convenient for work, with this increased benefit, that the intensity of its light is inversely as the square of the distance.

It is because of the fixedness of gaslight, and the moveability of the lamp, that so much less of the oil is required to obtain an equal advantage of light; and the amount of oil burned in the common coal-oil-lamp, as employed in our experiments, in the *same time* as 1000 cubic feet, expresses more correctly their relative economy. As two candles are usually burned for the same purpose, we insert their results also in the following table. Further, as the smaller lamp, Table V., experiment 3, is considered as affording ample light by many persons for reading, sewing, &c., we have included it. Lastly, the small chamber-lamp, Table V., experiment 4, is included, so that persons may compare its cost with that of the wax-taper floating on oil, or any other night-light. In order to make a fairer comparison of cost, the price of gas is assumed at 2·10 dols. per 1000 cubic feet.

TABLE VIII.

Name of Material burned.	Material, how burned.	Quantity burned in same time as 1000 Cubic Feet of Gas.	Relative Cost of Material burning in equal Time.	Cost for an average Winter Evening of Five Hours.
Philada. gas	5·1 cub. ft. pr. hr.	1000 cub. ft.	2·10 dols.	5¼ cents.
Petroleum	Large lamp.	1⅝ gallon.	0·73 „	1⅞ „
Do.	Smaller do.	1 „	0·45 „	1 1/7 „
Do.	Chamber do.	⅓ „	0·15 „	⅜ „
Spermaceti	Two candles.	7¾ lbs.	3·87 „	9⅞ „
Paraffin	Do.	7 „	2·24 „	5·7 „
Adamantine	Do.	10 „	2·25 „	5¾ „

A small chamber-lamp is usually burned through the whole night, say for ten hours. In this case, it costs three-fourths of a cent per night. But, let it be observed that, at this rate of cost, it gives three-fourths as much light as a sperm, paraffin, or adamantine candle, as shown by comparing its intensity, No. 4, Table V., with those of experiments 1, 3, and 5, Table VI. To ascertain the lowest limit of cost of this little lamp, we tried its consumption of oil with a very low flame, rising about one-tenth of an inch above the deflector, its light (not measured) appearing to be somewhat less than that of the common night-taper. In this case, its expense would be a little more than one-fourth of a cent for ten hours. But, at this low limit, combustion is not perfect, and a disagreeable odour arises from it. When burned at ¼ to ½, its fullest height, it emits no odour, and then costs a little more than one-third of a cent for ten hours.

In this essay, we have only taken into consideration the relative economy of mineral oils as sources of light, compared with gas and candles, in which respect the last column in Table VII., and especially the 4th column in Table VIII., show most convincingly that the oils will force themselves more and more into notice and use, and to a moderate extent will displace the use of gas and candles.

It would, however, be a partial, and perhaps culpable, view of the subject, if we were to omit a notice of danger in the use of the mineral oils, whether obtained from coal or petroleum. We have not made any direct experiments on this point, but we are bound to admit the result of experience in the use of the oils. Although they are far less explosive than burning fluid, or any alcoholic solution of a hydrocarbon, they are by no means free from liability to explosion. The danger arises from the presence of benzole (benzine), and other volatile hydrocarbons, which have not been expelled in the process of refining; and we shall probably be subjected to this danger some time longer, in consequence of the want of skill which knows not how to remove the volatile fluids, or by reason of manufacturing cupidity, which would prefer allowing them to remain in the oil, in order to increase the quantity sold. We think there is ground for asserting that the mineral oils *can be made* as free from danger as spermaceti or lard-oil. One great desideratum is a means of determining the freedom from danger by a simple apparatus, easily and inexpensively worked. Until the character of large dealers shall have been established for the sale of oil free from danger, we will content ourselves with this general advice to those who use the oils: never to fill a lamp at night, and not to store the oil where it can become heated.

It is not to be apprehended in the slightest degree that the oils will supersede the use of gas, especially in cities and towns, nor even in many country houses. Saving of labour, convenience, and greater safety, will cause gas still to dominate over all other sources of illumination. Besides, the astonishing cheapness of the natural mineral oils, and their richness in illuminating hydrocarbons, will probably oblige gas companies to consider the advisability of mixing mineral-oil-gas with coal-gas. The illuminating power of any coal-gas we have seen may be greatly increased with advantage, and the consequent liability to smoke may be obviated by diminishing the size or improving the form of the jet or burner.

Would the growl of the public be heard against a change of burners, if they were to receive due notice that, on and after a certain date, if they were to change all their burners to one-half the present size, they would get the same amount of light as they now do, without any more smoke, and at one-half the present cost; especially when they are informed that the whole cost of the change will be defrayed by the saving of the first six months or a year? We leave it to gas companies to resolve this question, or its alternative, whether the extraordinary comparative cheapness of mineral-oil illumination will not stimulate invention to contrive ways of burning the oil, or of making gas from it in a small way, so as to obviate every objection to its use, and so to supersede the use of company-made gas?

DR. J. NORTHCOTE VINEN'S REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY:—

1862. Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
July 5	4	14·71	13·98	14·36
„ 12	4	14·84	13·17	13·99

The volume of hydrocarbons amounted to 4 per cent.; carbonic acid averaged 0·60 per cent. There was no indication of sulphuretted hydrogen or of ammonia, except on the 2nd, when there was a slight trace.

LIGHTING OF BAHIA WITH GAS.—The principal streets of this city were successfully lighted with gas for the first time on the 9th ultimo. The *Journal de Bahia* records its satisfaction at the event, and the enthusiasm of the public found vent in cheers and music, and also in the recital of a poem composed for the occasion. The works have been erected in a very short space of time, by Messrs. Rankins of Liverpool, and the mains laid by Messrs. John Aird and Son, the eminent contractors of Lambeth, the whole being under the direction of Mr. George Clark, son of Mr. Joseph Clark, of the Imperial Gas-Works, Hackney Road.

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G.M.B.	3 5 0	2 13 6	2 15 0	3 0 0	3 5 0
1½ and 2-inch Socket-pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
5 and 5-inch ditto	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 inches and upwards ditto	5 15 0	4 15 0	5 0 0	5 0 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
Ditto, 2nd ditto, cold ditto	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank-plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

COALS.—*Per Ton.*

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead (at Leith)	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	28 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Pearth, South Pelaw, Washington Hutton, and South Pearth	7 6	Ditto, 2nd ditto	12 6
Pelton	7 9	Lesmahago (at Glasgow)	23 0
Ramsay's Newcastle Cannel	16 0	Ditto (at Leith)	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham and Rochester	5s. 6d.	Barcelona	£25 0s.
Cork	11 3	Bordeaux	£15. 0s. to 15 10
Dover and Folkestone	6 3	Boulogne and Calais	7 5
Dublin	11 3	Cadiz	16 5
Exeter Quay	8 0	Cronstadt	£11. 15s. to 12 5
Ipswich	6 0	Copenhagen	9 10
London (Pool)	5s. 6d. to 5 7½	Genoa	24 10
Lowestoft and Yarmouth	4 6	Hamburg	8 5
Lynn	—	Havre de Grace	£1. 0s. to 9 10
Portsmouth and Southampton	7 0	Leghorn	23 10
Plymouth	7 3	Lisbon	15 10
Shoreham	6 6	Rotterdam	8 0
Whitstable	—	Stettin	11 0
Weymouth	7 3	Trieste and Venice	£23. to 26 0

SUNDRIES.

Best Newcastle Fire-bricks—per 1000	£2. 10s. to	£2	15s. 0d.
Cliff's Fire-bricks (at Wortley)—per 1000		2	15 6
Ingham's ditto (at Wortley)—per 1000		2	15 0
Fire-clay Retorts—per foot run	5s. 6d. to	0	7 0
Tough Cake Copper—per ton		93	0 0
English Pig Lead—per ton		20	10 0
Welsh Bar Iron (in London)—per ton		6	0 0
Foreign Spelter—per ton		18	0 0
English Block Tin—per ton		114	0 0
Banca—per ton		115	0 0
Tarred Rope Yarn—per cwt.		1	6 0

Advertisements.

GEORGE GLOVER and CO.'s

PATENT DRY GAS-METERS,

THE STANDARD GASHOLDERS, AND TESTING APPARATUS.

The Act of Parliament, 22nd and 23rd Vict., cap. 66, for "Regulating Measures used in Sales of Gas," having come into operation, and limited the range of error in Gas Measurement to 2 per cent. as against the Customer, and 3 per cent. as against the Manufacturer, a far higher degree of accuracy in Meters than that generally attained hitherto is indispensable.

This necessity Messrs. GEORGE GLOVER and Co. are fully prepared to meet—their PATENT DRY GAS-METER being made in accordance with the same high standard of accuracy, and the same conditions and principles as those adopted in the construction of the National Standard Gasholders at the Exchequer, and the Derived Standards for London, Edinburgh, and Dublin, all of which were constructed from Mr. GEORGE GLOVER'S designs, and under his superintendence.

It is obviously the interest of Gas Companies to exert their legitimate influence to procure, without delay, the most accurate and durable Meters, since, by Sec. 16 of the Act, it is provided that "Every consumer of Gas may purchase and use for the measurement of the Gas supplied to him *any Meter* duly stamped under the authority of the Act."

Messrs. GEORGE GLOVER and Co. are ready to negotiate with Corporate Bodies, or with Gas Companies, for the supply of Meters on the principle of hire—10 per cent. being allowed for the collection of Meter-rent.

Messrs. GEORGE GLOVER and Co. keep in stock Meters from One Light to Two Hundred Lights, and make them to order of any size, at prices lower than Wet Meters, and as moderate as any in the market. They maintain them for Five Years in good working order, within the requirements of the Act, free of cost to the Purchaser; and, for a longer period, at a much lower cost than that at which Wet Meters can be maintained.

Particulars and Lists of Prices will be forwarded on application.

Messrs. GEORGE GLOVER and Co. are prepared to supply to Gas Companies, Gas Engineers, Meter Manufacturers, Local Authorities in Great Britain and Ireland, Colonial Authorities, and Foreign Governments, GASHOLDERS of the highest attainable accuracy, with proper Balances, Indices, and Apparatus, as the Sales of Gas Act requires, and exact copies of the National and Derived Standards.

The daily use of these instruments for nearly Eighteen Months has shown them to be thoroughly adapted to the purpose of their manufacture, and fully justified the opinion expressed of them by the Astronomer-Royal, in his report to the Lords Commissioners of Her Majesty's Treasury, as capable of "being applied to Gas-Measures of every class, and Gas-Meters of every class;" "as accurate as it is possible for human skill to make them;" "to all intents and purposes perfect."

Messrs. GEORGE GLOVER and Co. fit up TESTING-ROOMS with Gasholders and Apparatus, the same as those at the Exchequer, and adapted to the requirements of districts of any extent, either in the United Kingdom or abroad.

Estimates furnished when required.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON.

OFFICES: 22, PARLIAMENT STREET, WESTMINSTER; and 15, MARKET STREET, MANCHESTER.

INTERNATIONAL EXHIBITION,

Class XXXI., No. 6300; and Class X., No. 2291; and "Illustrated Catalogue."

International Exhibition,

July 11, 1862.

Class X., No. 2259.

The Jurors have **AWARDED A MEDAL** to

JOSEPH CLIFF and SON,

Wortley, nr. Leeds,

For Excellence of Material and Manufacture of

FIRE-CLAY RETORTS FOR GAS.

International Exhibition,

July 11, 1862.

Class XXXV., No. 6841.

JOSEPH CLIFF and SON,

Wortley, nr. Leeds,

Are Awarded Honourable Mention for

STONEWARE DRAIN-PIPES

OF LARGE DIAMETER.

TO GAS COMPANIES.

FOR SALE, a Telescopic Gasholder, about 53½ ft. diameter by 24 ft. in depth, having a working capacity of about 50,000 cubic feet.

Also, two Single-lift GASHOLDERS, each about 33 ft. diameter by 18 ft. in depth, and each having a working capacity of about 15,000 cubic feet.

These Gasholders have guiding and counter-balancing apparatus complete, are now at work, and in excellent condition.

Apply to W. ESSON, Engineer, Gas-Works, CHELTENHAM.

BEVERLEY'S Patent Equitable GAS-METER,

From which the Water cannot be abstracted.

JOHN BEVERLEY & SON,

GAS-METER MANUFACTURERS, &c.,

LEEDS, YORKSHIRE,

Are prepared to supply the above Meters, either stamped or otherwise, and to adapt their patented principle to any old Meters that may be sent to them to be repaired, tested, and stamped.

Manufactory, No. 9, Mark Lane, LEEDS.

TO GAS COMPANIES.

ON SALE, by Private Treaty, at the Gas-Works, St. Helen's, Lancashire, a STATION-METER, capable of passing 7000 cubic feet per hour, with Bye-Pass, Clock, and Tell-tale.

Reference can be made to Messrs. WEST and GREGSON, Meter Manufacturers, OLDHAM.

Apply to Mr. WILLIAM PRITCHARD, Gas Office, ST. HELEN'S.

THE SEWAGE UTILIZATION COMPANY.

(William Footman's Process for Applying Sewage to Land.)

TEMPORARY OFFICES:—

5, GT. QUEEN STREET, WESTMINSTER.

Communications on the above subject to be addressed to MR. WILLIAM FOOTMAN.

Plans of Town Drainage advised upon. Efficiency and economy in works, with perfect freedom from all nuisance whatever, guaranteed.

WILLIAM RICHARDSON & CO., TUNNEL FOUNDRY, DUDLEY,

Manufacturers of Gasholders, and all descriptions of Gas Apparatus, beg to call the attention of Gas and Water Companies to their Double-Faced SLIDE-VALVES, which for Economy and Durability cannot be surpassed, and respectfully solicit a trial. Full particulars on application.

LEAKAGE OF GAS-MAINS AVOIDED BY COATING WITH

YOUNG'S IRON PAINT.

This Paint has been proved, by four years test, to stand all the purposes required in Gas-Works, and has the peculiar property of drying over work previously coated with Tar.

Manufactured by J. W. YOUNG, Neath, GLAMORGANSHIRE.

Agent for London, Mr. JOHN REED, 44, Argyle Square, King's Cross, LONDON,

TAR AND AMMONIACAL LIQUOR FOR SALE.

THE Directors of the Blackburn GASLIGHT COMPANY, are prepared to receive Tenders for the Purchase of all the TAR and AMMONIACAL LIQUOR to be produced at their Works, for a Term of two, three, or five years, from the 1st of January, 1863.

Printed conditions and other information may be obtained from Mr. O. BROTHERS, the Company's engineer, by whom Tenders in writing will be received until the 1st of September next.

Gas-Works, Blackburn, June 14, 1862.

NEW WORK ON VENTILATION.

Now ready, with 7 Plates and 35 Woodcuts, 8vo., 8s. 6d., cloth (postage 6d.),

A Treatise on Ventilation, Natural and Artificial, by ROBERT RITCHIE, C.E., Associate of the Institution of Civil Engineers, London, author of "Railways: their Rise, Progress, and Construction," "The Farm Engineer," &c.

LONDON: LOCKWOOD and Co., 7, Stationers' Hall Court, E.C.

STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER and CO. (Contractors to Government).

24 WHARF, HARROW ROAD, PADDINGTON, W.

Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.

CRUCIBLE and CEMENT CLAYS.

GARDEN EDGINGS, of various patterns.

BUFF and ORNAMENTAL TILES.

CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.

Shipments on the shortest notice.

A. and C. MILLER, Agents for English and Welsh Gas, Steam and House Coal Collieries. Ship, and Insurance Brokers. Gas Coals, 11s. 6d. in the Pool; drawback, 1s. per ton.

No. 9, George Yard, Lombard Street, and Coal Exchange, LONDON, E.C.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,

Old Barge Iron Wharf, Upper Ground Street, LONDON.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coalfields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas-Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:

MR. ALEXANDER STRATTON,

109, WEST GEORGE STREET.

GAS Stoves, Gas Baths, Gas Cooking APPARATUS, warranted the best in England at PHILLIPS'S, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.

PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

WILLIAM RICHARDSON (LATE OF DUDLEY),

CONSULTING ENGINEER,

PATENTEE OF THE VERTICAL OVEN RETORT

No. 367, PERSHORE ROAD,

BIRMINGHAM.

Just Published, price £2. 2s.,

MANUAL of HYDROLOGY. By NATHANIEL BEARDMORE, Civil Engineer.

CONTAINS:

Division I.—Hydraulic and other Tables.

Division II.—On Rivers and Flow; Percolation of Water, and Wells and Springs.

Division III.—On Tides, Tidal Rivers, Estuaries.

Division IV.—On Rainfall and Evaporation.

The Work consists of upwards of 400 pages, and there are 20 large plates.

London: WATERLOW and SONS, 49, Parliament Street. May be ordered through any Bookseller,

A FIRST-CLASS Mechanical and Gas-Engineering Draughtsman, and good Surveyor, is open to an ENGAGEMENT, permanent or otherwise. Is capable of taking the management of a Gas-Work. Unexceptionable references.

Address A.L., 6, Romney Terrace, Horseferry Road, WESTMINSTER, S.W.

THE OTTOMAN GAS COMPANY, LIMITED.

NOTICE.—The Permanent Offices of this Company, are situate at No. 6, Copthall Court, Throgmorton Street, LONDON, E.C.

WALTER DAVISON, Secretary.

TO FITTERS.

WANTED, for the country, a WORKMAN competent to lay mains and services, fix, inspect, and adjust meters and street-lights, and do the general fittings connected with a small Gas-Work. A person with a knowledge of smiths work preferred. Reference to last situations will be required, and a character for strict sobriety is indispensable. Wages 24s. per week.

Applications, in own handwriting, addressed to Z., Post-Office, Hatcham, SURREY.

DR. NORMANDY'S

PATENT PIPE-JOINTS.

HOLLY BUSH PLACE, BETHNAL GREEN ROAD, N.E.

The advantages which these Joints offer are economy, perfect soundness and durability, ease and rapidity of application, use of perfectly plain pipes, without sockets, screws, or projections of any kind, so that a tight Joint may be made, even though the ends of the pipes to be united do not come close together. Any ordinary labourer is capable of securely fixing them.

These Joints are particularly applicable to gas, water, and suction-pipes, the Joints remaining permanently sound; they are cheaper than the socket and spigot at present in use for gas and water-pipes, inasmuch as they save the lead, the gasket, the iron forming the socket (which, for example, in a 3-inch main amounts to 10 lbs.), and the fire necessary for melting the lead; a considerable saving is also effected in the time of making the Joint, more than four Joints being completed in the time required to make only one of the others.

By unscrewing two bolts, a pipe can instantly be taken up or removed, and another substituted for it with the greatest facility.

By means of these Joints, pipes made of either wrought or cast-iron, copper, lead, tin, earthenware, glass, paper, bitumen, gutta-percha, suction-hose, and, in fact, any material of which pipes or tubes can be manufactured, may be rapidly and soundly united, and taken apart with extreme facility.

They are made of all sizes, so as to suit pipes ¼ of an inch external diameter and upwards; each Joint increases in the ratio of ¼ of an inch, and has a number cast on it, according to its size; these numbers indicate (without reference to the list) the size of pipe for which they are intended; for example, No. 7 will suit a pipe ⅞ of an inch external diameter, No. 12 a pipe 12/8ths (or 1½ inch) external diameter.

As the inside diameter of the joint should be about ¼ of an inch larger than the external diameter of the pipe, the size nearest to that required should be selected.

N. DEFRIES,
Consulting Gas Engineer, Inventor and Patentee of
WET GAS-METERS,
with Self-Adjusting Water-Line;
DRY METERS,
Gas-Heating Baths, Ovens, Stoves, Gas Fires with Indestructible Fuel, &c.
Factory: Diana Place, Fitzroy Square. Office: 406, Euston Road, LONDON, Eight Doors from Factory

A very severe illness, which confined me for some months to my bed, prevented me from entering into arrangements for the exhibition of my Patent Dry Gas-Meter, and other Patent Inventions in the present International Exhibition, all the space having been allotted before my recovery. I have, however, had the good fortune, through the medium of the Western Gas Company to have one of my Meters for 150 lights, and also one for 60 lights, supplied by Messrs. De Ville, and Co., Strand, at work in the supply of gas to the above building, where they give perfect satisfaction.

My Meters, for which I received the medal, &c., at the Exhibition of 1851, have now stood the test upwards of 20 years, and I challenge the world to surpass them.

The following are a few of the many testimonials I have received, and which prove their superiority over any other Meters.:—

Copy of Letter received from Messrs. SHOOLBRED *and* Co. *Tottenham Court Road.*

May 8, 1862.

Sirs,—In reply to your letter, respecting Gas-Meters manufactured by Mr. Defries, we can say there are 7 in our establishment; some have been in use 20 years, and they are all dry.

We have discontinued Water-Meters some years. Your letter was overlooked in the pressure of business.—We, are sirs, your obedient servants,

(Signed) J. SHOOLBRED and Co.
H. BOWEN.

To Messrs. A. W. Harris and Co., Dublin.

Copy received from Messrs. E. MOSES *and* SON, *Minories, Aldgate.*

May 9, 1862.

Dear Sir,—We have much pleasure in bearing testimony to the efficiency of your Patent Dry Gas-Meters, which we have had in our establishment as above several years, and are still working satisfactorily.—Yours, &c., (Signed) E. MOSES and SON.

Mr. N. Defries.

Copy of Letter received from Mr. T. W. COOKE, *gas-fitter, &c., 23, Mary Street, Hampstead Road.*

Dear Sir,—I have great pleasure in informing you, and which I think will be satisfactory for you to know, that I took down a 200-light Dry Meter, of your make, May 7, 1862, to be tested: this was supplied to the Chartered Gas Company, June 1855, No. 59,000, and fixed at Messrs. Firmins, White Horse Yard, Drury Lane, after the usual tests by the Government gas-inspector, as per Sales of Gas Act, it was found perfectly correct, and refixed the next day, and I think it also right to add that the Meter has undergone several severe tests while at work.—I remain yours truly,

(Signed) T. W. COOKE.

Mr. N. Defries, Euston Road.

THE ST. PANCRAS WORKHOUSE GAS-METERS.

To the Editor of THE ST. PANCRAS REPORTER.

Sir,—In justice to myself, and to the public at large, I beg to inform you that the 200-light gas-meter placed at the St. Pancras Workhouse gate, and the 100-light meter placed in the body of the house, were both manufactured by me, and supplied to the workhouse about four years ago. These two meters have been tested by the Government Inspector, at the office, St. Martin's Lane, and were reported upon in your issue of May 24, when Mr. Robson observed in the vestry that the Government Inspector said the 200-light meter was the largest and most correct meter he had ever tested. The above meters were also referred to in your issue of June 7, and reported as having been found perfectly correct.

The following is an exact copy extracted from the office-register of the inspector appointed under the "Sales of Gas Act" with refence to both meters:—

The 200-light meter, registering 1200 feet per hour, registered ·45 too fast.

The 100-light meter, registering 600 feet per hour, registered ·69 too slow.

As it is exceedingly difficult to produce a meter that shall register accurately and without variation for a very long time together, the "Sales of Gas Act" provides that where a meter registers 3 per cent. too slow (that is, in favour of the consumer), or 2 per cent. too fast, which, of course, is in favour of the gas company, such meter shall be deemed correct. You will see, therefore, that my meters after four years use have not, both together, varied more than 1½ per cent., and that in favour of the consumer; and that this proves a degree of perfection in their construction which might well draw from the inspector the high encomium he bestowed upon them when tested by him.

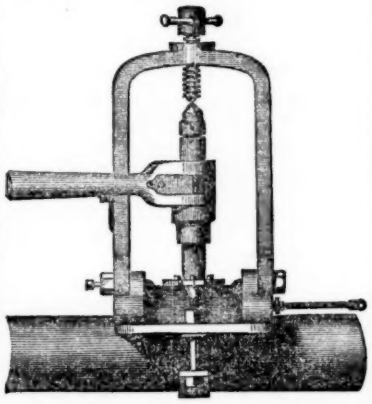
From some error of your reporter in your issue of the 24th of May, my name is given as the inspector instead of the manufacturer of the meters.

With regard to to the meter placed in the basement of the workhouse reported on in your issue of June 7, as registering over 5 per cent. too fast (that is, in favour of the gas company), it was not one of my make, and, I believe, it had only been in use about twelve months. Of course, it was tested by the gas company, as all the meters are, and, I presume, was correct when put down. I need not point out the vast superiority of my meter to that now referred to; suffice it to say, it has been returned to the gas company by the parish authorities, and a new 100-light meter of my manufacture purchased of me, and put down in its stead.

I am, Sir, yours respectfully,

June 26, 1862. N. DEFRIES.

SIMMONS'S PATENT GAS AND WATER CONNECTOR.



This Machine is invaluable to Gas and Water Companies, Gas-Fitters, &c., being the only Connector whereby accidents can be prevented. It is simple in construction, economical in saving the escape of Gas, and can be worked by a labourer.

No. 1 size, to suit ⅜ and ½ in. Services, £6. 6s. each.
„ 2 „ „ ¾ and 1 „ „ £8. 8s. „
„ 3 „ „ 1¼, 1½, & 2 in. „ £12. 12s. „
Including Rachet Brace, Drills, Taps, &c., complete.

MANUFACTURER,
J. COWDY,
BOND COURT, WALBROOK,
LONDON.

Connectors made for fixing on the ends of Mains, to prevent escape in course of laying.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N., LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent, Rye Gas-Works.

Messrs. Cutler and Co.

DUPLEX GOVERNOR, for Gas-EXHAUSTER ENGINES.
D. LANE'S PATENT.

This Governor combines great delicacy with remarkable certainty of action. A pressure of one-tenth of an inch of water, operating on a diaphragm of 3 inches diameter, is sufficient to work the Regulating-Valve of an Engine of any power.

TESTIMONIALS.

Borough Engineer's Office, Town Hall
Halifax, March 29, 1862.

Dear Sir,—I have much pleasure in bearing my testimony to the efficiency of your Duplex Governor for regulating the speed of Gas-Exhausters.

The Governor has been perfectly self-acting, and has never given us one moment's thought, trouble, or expense. The engine-man has only to weight the tappets to the required vacuum, and the pressure-register paper never shows a greater variation than three-tenths in the twenty-four hours.

I can very confidently recommend the adoption of it to engineers and managers of gas-works making 50 million feet a year and upwards.

I am, dear Sir, yours faithfully,
G. W. STEVENSON.

Denny Lane, Esq., Cork Gas-Works, Ireland.

Gas-Works, Cork, April 4, 1862.

Dear Sir,—Having for some time past had in use three of your newly-invented Regulators for governing the speed of Steam-Engines in connexion with Gas-Exhausters, I am glad that I am able to speak of this valuable machine in terms of the highest praise. I have had them applied, as you know, to high-pressure and condensing engines, with Beale's and also Anderson's Exhausters. In every case, this small and valuable instrument is thoroughly effective in regulating the speed of the Exhauster. No amount of care with the hand can equal its accuracy of action for the intended purpose.

Denny Lane, Esq. A. H. STILL, C.E.

An Illustrated Circular, explaining the operation of the Governor, can be obtained by application to D. LANE, 72, South Mall, CORK; and the Governor can be seen in London at the Offices of GEO. ANDERSON, Esq., C.E., 16, Adam Street, ADELPHI.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

JOHN ROGERSON and CO.
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:
12, ROYAL EXCHANGE BUILDINGS.

BENJAMIN GIBBONS, Jun.,
DEEPDALE FIRE-CLAY & BRICK WORKS,
Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,
TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET, MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contracts for Gas-Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

ANDERSON'S EXPERIMENTING LABORATORY
AND
GAS ENGINEERING OFFICES,
16, ADAM STREET, ADELPHI, W.C.
(*Close to the Society of Arts.*)

Mr. ANDERSON continues to Erect, or to supply the Drawings for his PATENT RETORT-SETTINGS. On this principle, three Ovens of Retorts are heated by one Coke and one Tar fire; and, for small Works, the principle is adapted to single Ovens in both cases, with a total absence of smoke, while the duration of the Retorts is from two to three years, and with great economy of fuel.

Mr. ANDERSON continues to supply his PATENT GAS-EXHAUSTER, together with Steam-Engines, &c., erected complete.

This is the most simple machine of the kind in use, being merely a double-action Pump, which any one can comprehend, and works for years without any repair.

Also, his PATENT FOUR-WAY VALVES. One of these valves does the work of three ordinary valves, when applied to Purifiers, Station-Meters, or other Gas Apparatus.

A workman cannot, by any possibility, make the mistake of shutting one passage without opening another; thus ensuring a constant flow of the gas.

All Racks, Pinions, Springs, and other delicate parts of ordinary valves, are in these valves abolished; the Connecting-pipes are also much simplified, and the cost reduced fully 30 per cent.

Also, his CONCENTRIC GOVERNOR, which stands in half the space of the ordinary Governor, and regulates the flow of Gas to the greatest nicety.

Mr. ANDERSON having five Gas-works on lease, besides being engineer to several others, has constant opportunities of perfecting his inventions before they are brought under public notice.

Mr. ANDERSON, in conjunction with Mr. STEVENS, of the Darlington Works, has recently erected and leased for a term of years, two Gas-Works of the Government, one at VICTORIA HOSPITAL, the other at the CAMP at ALDERSHOTT. At both places, the above designs are introduced, and cards to view may be had on application; as also, references to gentlemen who have used his apparatus for years.

Mr. ANDERSON may be consulted on all matters connected with the Manufacture of Gas, the Construction of new, or the reconstruction of old Works, Valuing the same, or obtaining parliamentary powers.

The Laboratory is being fitted up with apparatus for testing the chemical and photometrical properties of Coal-Gas, and also that of Meters, agreeably with the Act of Parliament. Gentlemen desirous of inquiring into such matters, are invited to pay a visit.

PORTER AND CO.,
GAS ENGINEERS AND CONTRACTORS,
LINCOLN;
AND 7, JOHN STREET, ADELPHI, LONDON, W.C.

PATENT Silica Bricks, adapted for Intense Heats of Copper, Iron, Glass, and Chemical Works.
PATENT SILICA RETORTS, as supplied to the Manchester Corporation Gas-Works.
Apply for Prices to H. J. WALDUCK and Co., Queen's Chambers, Market Street, MANCHESTER.

ESTABLISHED 17 YEARS.

OFFICE for the Procuration of LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.
GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

METROPOLIS GAS, 1850 to 1860.

FOR SALE, bound in Calf, 917 pages, price £1. 11s. 6d., a few copies of Reports of Proceedings in Parliament, and elsewhere, on Matters affecting the Supply of Gas in the Metropolis, viz.: The GREAT CENTRAL GAS CONSUMERS BILL, 1850; The ARBITRATION BETWEEN MR. CROLL AND THE COMPANY, 1857; The MARYLEBONE GAS CONSUMERS COMPANY'S BILL, 1859; CITY GAS COMPANY'S BILL, Lords and Commons, 1859; and, The METROPOLIS GAS REGULATION BILL, Lords and Commons, 1860.
W. B. KING, 11, Bolt Court, Fleet Street, LONDON.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS
&c. &c.
RETORT MOUTHPIECES, BOLTS, NUTS, &c.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—
Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

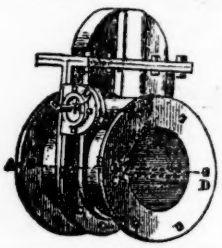
BELGIAN CLAY RETORTS.

ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to ALBERT KELLER GHENT, will receive immediate attention.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c.
UNION STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.
W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

WALTER FORD,
LATE
PADDON and FORD,
GAS-METER AND APPARATUS WORKS,
GRAY'S INN ROAD, LONDON.
MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.
A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.
Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

F. & C. OSLER,
45, OXFORD STREET, LONDON;
Manufactory—Broad Street, Birmingham—Established 1807,
MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.
ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.
THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.



REDUCED PRICES OF
BRYAN DONKIN & CO.
IMPROVED GAS VALVES
from 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter
List of prices, with full dimensions of all sizes up to 30 inches, to be had on application.
These Valves are all proved to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
Valves made with Outside Racks to order. Also, Screw Water-Valves with Gun-Metal Faces.
BRYAN DONKIN & CO.,
ENGINEERS,
NEAR GRANGE ROAD, BERMONDSEY.

FIVE HUNDRED
HOLMAN'S PATENT DOUBLE-ACTION PUMPS
Prove their general adaptation. They are adopted by
CIVIL, MARINE, MANUFACTURING, AND MECHANICAL ENGINEERS.
For Pumping TAR, AMMONIACAL LIQUOR, WATER, WORT, and other fluids, their intrinsic excellence is too well known to need description.
S. HOLMAN tenders his hearty thanks to all Patrons, and is prepared to undertake the Supply of Towns, Public and Private Establishments, and Irrigation of Lands, on any scale.
Sole London Agent of the Williams's Perran Foundry Company, for the Sale of Cornish Pumping, Winding, and other Steam-Engines, heavy Machinery, Castings, and Forgings.
London Agent for Tangye's Patent Hydraulic Presses, Jacks, Lifts, Crabs, Cranes, Blocks, &c.
ALL KINDS OF HYDRAULIC AND STEAM MACHINERY FOR HOME USE OR EXPORT.
Illustrated Catalogues free.
LONDON AGENT FOR WROUGHT-IRON TUBES AND FITTINGS,
S. HOLMAN, C.H.E., 18, CANNON STREET, E.C.

WALKERS GAS-VALVES
HAVE BEEN
DURING THE PAST TWENTY-FIVE YEARS,
USED IN UPWARDS OF
450 BRITISH and FOREIGN GAS-WORKS.
They are made in the most SOLID, SUBSTANTIAL manner, with PLANED and SURFACED JOINTS, and SCRAPED SURFACES. They have a CLEAR, FULL BORE, in a STRAIGHT LINE of PIPE, and are TIGHT to PERFECTION.
Engineers are requested to insert "Valves of Walkers Manufacture" in their Specifications, by which they will be absolutely certain of the above important advantages. They can name the construction of Valve they prefer best, as Walkers make them of every description—either Walkers SCREW-VALVES, for the Gas-Works or for Street-Mains; INTERNAL RACK-VALVES; or the ORDINARY RACK and PINION-VALVES. REGULATING-VALVES, with INDICATING COLUMNS, &c.
Walkers London Manufactory is devoted entirely to the above class of work, of which their make is nearly double that of any other British house.

INTERNATIONAL EXHIBITION.—Class 10.
A Gas-Valve of each kind can be seen in the above Class. HER MAJESTY'S COMMISSIONERS selected Walkers Valves for the LIGHTING OF THE BUILDING, and the PRESSURE and SUPPLY is governed by Walkers Regulating Indicating Column and Valve, which can be SEEN IN ACTION in the the Gas-Meter Room, Austrian Court.

WALKERS DOUBLE-FACED WATER-VALVES
Possess a most important practical improvement on the Stuffing-Box, effecting a large saving in a Water-Works Company's expenses. They are made with Four Gun-Metal Faces, scraped Surfaces, Gun-Metal Screws and Nuts, and are proved to three hundred pounds on the square inch.
IMPROVED DOUBLE-FACED HYDRANTS, &c.
Drawings and Prices on Application.
LITTLE SUTTON STREET, LONDON, E.C.

INTERNATIONAL EXHIBITION—CLASS XXXI. AND XXXIV.

THE NEW CRYSTAL STAR AND SUN LIGHT.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRASS, AND ORMOLU CHANDELIERS;

BRACKETS, PENDANTS, AND VESTIBULE LIGHTS;

MEDIÆVAL, AND OTHER GAS-FITTINGS.

Works—

LONDON AND BIRMINGHAM.

PRINCIPAL DEPOT AND LONDON SHOW-ROOMS—

147, HOUNDSDITCH, CITY.

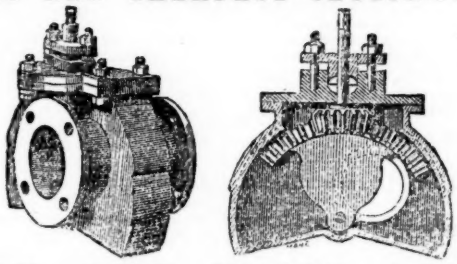
Estimates and Designs for Lighting and Ventilating Theatres, Concert-Rooms, Public and Private Buildings, can be had upon application at the above Address.

Registered Designs of Crystal Chandeliers, for Gas or Candle, always on Show.

The PATENT GAS-REGULATOR AND PURIFIER, reduced to 6s. 6d. per dozen.

A Large Assortment of Gas Moons, Chimneys, and Reflectors, of every description, always on hand.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

W. J. HOLLANDS,

IRON MERCHANT AND AGENT,

AND

Wholesale and Retail Charcoal and Coke Dealer, and Grinder,

12 & 31, BANKSIDE, & GREAT SUFFOLK STREET, SOUTHWARK, S.E.

ALL GOODS KEPT IN STOCK, AND SUPPLIED AT MANUFACTURERS PRICES.

Cast-Iron Socket, Flanch, Hot Water-Pipes and Connexions, for Gas, Water, and Steam purposes, Rain-Water-Pipes and Guttering, &c. Furnace-Pans and Stable-Fittings. Retorts, Hydraulic Main, Furnace-Work, &c. Lamp-Columns, Lanterns, Cocks and Burners, Wrought-Iron Tubing, &c., of best description. Screw-Cocks, Sluices, and Gas-Valves of every description. Bar, Rod, Plate, and Hoop-Iron Bolts and Nuts. Cast-Iron Columns, Girders, Street-Posts, Watering-Posts, Gutters, Gratings and Railing-Bars, Tank-Plates, and Pump-Castings. Engine, Mill, and Lathe Castings. Planing, Turning, and Boring executed. Cast-Iron Pans, for Soap and Chemical Works. Galvanized Cast-Iron Jars and Pots, for Sugar Refiners. Stourbridge and Newcastle Fire-Bricks, Retorts, Lumps, Tiles, and Clay. Malleable Iron Castings. Pipe-Laying by Contract. Double-Refined Machinery Oil. Iron Borings. Salammoniac and Sulphur.

Castings made in Town or Country, on the shortest notice, to Sketches, Drawings, or Patterns.

Best Animal Charcoal, for Sugar Refiners, and Case-Hardening.

Best prepared Wood Charcoal. Prepared Fuel for Smokeless Stoves guaranteed. Granulated Charcoal for Air and Water Filters. Chemists and Druggists supplied with Pulverized Carbon. Charcoal and Coke Blacking, and Coal-Dust, and superior strong Coke, for Foundry purposes. Gypsum of the finest and purest quality. Sulphate of Ammonia.

Estimates given, and Orders by Post punctually attended to the same day.

AGENT FOR

BECK'S PATENT STOP-VALVES,

For Gas, Water, Steam, and General Purposes, and

DAVIS'S PATENT COMBINED SMALL-COKE OR BREEZE OVEN, & SMOKE CONSUMER.

EDWIN DIXON,

WOLVERHAMPTON PATENT WROUGHT-IRON TUBE WORKS,

Originally established in 1833,

Manufacturer of Gas and other Tubes, Fittings, and articles of every description belonging to Gas, Water, or Steam.

E. D. had the honour of receiving the

PRIZE MEDAL

warded to this Manufacture by the COUNCIL of the GREAT ENGLISH EXHIBITION of 1851; and from he latter date has supplied many towns exclusively with GALVANIZED and other Tubes for Gas and Water, under GOVERNMENT ENGINEERS.

A City, containing 150,000 inhabitants,

has recently been entirely supplied with Tubes made at the above-named Works, and several others with populations nearly as great; in fact, the reputation now acquired induces this notice to the public.

Large Stocks generally on hand, averaging from one to three hundred thousand feet.

HYDRAULIC PRESS TUBES,

to resist 6000 lbs. and upwards to the square inch, extensively manufactured.

STOCK DIES and SCREWING TACKLE

of the best possible descripton.

Every Tube carefully tested with Hydraulic Pressure before leaving the Works.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

GEORGE BOWER,

GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,

ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,

MILL WALL, POPLAR, LONDON, E.

Main Laying and Gas-Works erected complete.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, MR. E. M. PERKINS, 78, Lombard Street.

WILLIAM BLEWS AND SONS,

IMPROVED MACHINE-MADE BURNERS

WROUGHT-IRON BATSWINGS,

FOR RAILWAY STATIONS AND MARKETS,

GAS-FITTINGS, CHANDELIERS,

BRASS AND IRON TUBES OF EVERY KIND

SUPPLIED ON THE BEST TERMS,

AT THE WORKS,

9, 10, 11, BARTHOLOMEW STREET,

BIRMINGHAM.

ROBERT MACLAREN and CO.,

EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

LESLIE'S PATENTS: Gas and Coke from common Coal, greatly increased in value.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Up to Forty Candle Gas.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Licenses for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: The National Waste Heaps at Collieries UTILIZED for Gas purposes.—60, Conduit Street, LONDON, W.

ALFRED PENNY, Gas and CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

GUEST & CHRIMES,

FOUNDRY AND BRASS-WORKS, ROTHERHAM,

AND

37, SOUTHAMPTON STREET, STRAND, LONDON,

(Late CROSLEY & CO.,)

GAS-METER MANUFACTURERS,

REMOVED, from 103, SOUTHWARK BRIDGE ROAD, LONDON, to

ROTHERHAM.

Gas-Meter Works, 103, Southwark Bridge Road,
London, April, 1862.

Sir,

I have the pleasure to inform you that I have ceased to be a gas-meter manufacturer, having disposed of my business to the well-known firm of Guest and Chrimes, of Rotherham, the makers of the Patent High-Pressure Water-Meter, and High-Pressure and Patent Fire-Cock, who will henceforth be the Sole Manufacturers of Crosley and Goldsmith's Patent Compensating Wet Gas-Meter.

The well-established reputation of that firm, as to quality of materials and workmanship of all goods supplied by them, is a sufficient guarantee that the character of these Meters will be maintained at the high standard of excellence which has always attached to them; and I have full confidence in asking for them a continuance of the patronage I have hitherto enjoyed from you.

My late manager, Mr. Lane, remains with Messrs. Guest and Chrimes, in the position he has held in these works since their establishment. Begging you to accept my best thanks for the favours I have received at your hands during my connexion with the business,

I am, Sir, yours most obediently, ISAAC BRIGGS.

Foundry and General Brass-Works, Rotherham, and 37, Southampton Street, Strand, London, W.C.
Rotherham, April 11, 1862.

We have the pleasure of informing you, as intimated in the annexed letter, that we have purchased the business of Mr. Isaac Briggs, of 103, Southwark Bridge Road, London, Manufacturer of Crosley and Goldsmith's Patent Compensating Gas-Meter, which it is our intention to remove to our works at Rotherham. The established character of the Meter for accuracy of registration needs no comment from us. It is especially constructed to meet all the requirements of the recently-imposed Sale of Gas Act, and upon such certain and simple principles as to insure correctness of measurement for long periods, without involving the necessity of constant care and attention on the part of the companies' inspectors and officers, as the large quantity of water contained in the surplus reservoir (except in extreme cases) will insure many months working. We have, therefore, the greatest confidence in soliciting your orders, feeling quite certain of their giving full satisfaction; and we would remark that, though apparently a high price, yet, when the quality of the workmanship and materials is taken into consideration, in addition to the large capacity of the Meter, and its other advantages, it will bear a comparison with any first-class article.

We would add that, although not enumerated, all the various articles made by the late firm will be manufactured by us, and under the same management as previously. We hope shortly to be in a position to submit to you a detailed description of the Meter, and all other articles we manufacture connected with Gas, its distribution and consumption, with prices of the same. Soliciting your commands,

We are, yours respectfully, GUEST & CHRIMES.

SOLE MANUFACTURERS OF

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS,

Which, by a simple arrangement of machinery, maintain a constant, true Water-Line.

N.B.—The Patent can be applied to any existing Wet Gas-Meters.

Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool; and other Patterns.

Consumers' Governors; Inspectors' Pocket, and all other kinds of Pressure-Gauges; Thermometers;

STANDARD TESTING GASHOLDERS,

And Apparatus required under the Sales of Gas Act.

STATION-METERS & GOVERNORS; PRESSURE-REGISTERS & EXHAUSTER-REGULATORS.

Also, Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night. Also,

MANUFACTURERS OF

BATEMAN AND MOORE'S, AND CHRIMES'

PATENT HYDRANTS, OR FIRECOCKS.

Improved Sluice-Cocks and Gas-Valves; Chrimes' Patent High-Pressure Single and Double Loose-Valve and Screw-Down Cocks; Pilbrows' Patent Water-Waste Preventer;

PATENT ABSOLUTE WATER-WASTE PREVENTER;

Siemens' Patent Balance Water-Meter; Bell and Chrimes' Patent Service-Box Valve; Improved Self-Acting and Pull Water-Closet;

ESKHOLME'S PATENT PNEUMATIC REGULATOR and VALVE-CLOSET.

Lowe's Patent Effluvia-Traps, Begg's Improved; Fire-Extinguishing Apparatus; Galvanized Iron Tubes and Fittings; *Gas Chandeliers, Brackets, and Fittings; Glass Chandeliers and Brackets.*

All the above articles may be seen on application to

THOMAS BEGGS, 37, Southampton Street, Strand, London; or to

GUEST and CHRIMES, Brass-Works, Rotherham,

Manufacturers of Plumbers' and Gas-Fitters' Brass-Work of every description.

Drawings, Descriptions, Prices, and Testimonials, will be forwarded per Post, on application as above.

THE ALPHA TUBE WORKS,
WALSALL, STAFFORDSHIRE. ESTABLISHED 1830.
LAMBERT, BROTHERS,
MANUFACTURERS OF
WROUGHT-IRON TUBES AND FITTINGS,
For Gas and High-pressure Water and Steam.

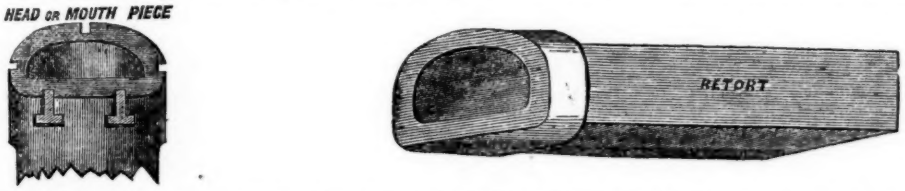
HENRY BALFOUR AND CO.,
ENGINEERS & IRONFOUNDERS,
DURIE FOUNDRY,
LEVEN, FIFE;
& 16, ADAM STREET, ADELPHI, LONDON, W.C.
Gas Engineers and Contractors for Gas and Water-Works; manufacturers of Steam Engines and Exhausters, Steam Boilers, Gasholders, Cast-Iron Tanks, Purifiers, Condensers, Iron Retorts, Gas and Water Pipes.
Plans, Specifications, and Estimate furnished for new, or for extensions and alterations on existing, Works.

TRUSS'S PATENT ELASTIC PIPE-JOINT,
FOR GAS AND WATER-MAINS, AND STEAM PIPING,
Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.
Drawings, Estimates, and every particular, furnished on application to
THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

COCKEY'S PATENT GAS-VALVES.
These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.
The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and, when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.
These Valves are adapted either for bye-passes; for connecting two, three, and four purifiers; or for the inlets of several Gasholders, and are in use for these purposes at the following Works:—

ALTON, HANTS.	CLEVEDON.	ENNISCORTHY.	NEWPORT, MONMOUTH.
BRIGHTON.	CHELTENHAM.	FROME.	REDRUTH.
BASINGSTOKE.	CHATTERIS.	GODALMING.	RYDE, ISLE OF WIGHT.
BLANDFORD.	CUCKFIELD.	HESSLE.	SALISBURY.
BARKING.	EASTBOURNE.	LANGPORT.	WARMINSTER.
CANTERBURY.	ELGIN.	MALVERN.	

Besides many small private Gas-Works.
There are Two specimens at the International Exhibition in Class 10; one of them represents the Valve with its Index-Plate fixed for regulation, and the other shows the Valve open, exposing its passages.
IRON WORKS, FROME SELWOOD.

KING BROTHERS,
STOURBRIDGE FIRE-BRICK AND RETORT WORKS.


KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.
Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.
Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.
JOSEPH CLIFF and SON,
WORTLEY FIRE-BRICK WORKS, near LEEDS,
Are Awarded the PRIZE MEDAL for Excellence of Material and Manufacture of Clay Retorts, July 11, 1862.
Class X., No. 2259.
THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.
To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.
THE WORKS ARE WELL SITUATED
For EXPORT from the Ports of LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.
FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.
M. P. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

International Exhibition, 1862.

MESSRS.

CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Exhibited in Class XXXI. (B),

Have obtained the Medal for

"GOOD CONSTRUCTION AND SOUND WORKMANSHIP."

FACTORY:

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the Office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, July 15, 1862.